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ORIGINAL ARTICLES

ABNORMALITIES OF TEETH AND JAWS FROM THE STANDPOINT OF INHERITANCE*

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AFTER trying to get together the available facts regarding the part played by heredity in dental and facial abnormalities, I find myself in much the frame of mind of the quarrelsome negro described in one of the late Ambassador Page's letters. This negro tried in vain to exasperate a fellow negro into a fight. In spite of the storming and swearing of the first negro the other remained stubbornly silent. Finally negro Number 1 burst out with, "Look here, you kinky-headed, flat-nosed, slab-footed nigger, I warns you 'fore God, don't you keep givin' me none o' your damned silence."

Like the vexed negro, I have found silence—or in other words the absence of reliable data—a great source of irritation. Opinions in this field, I find in abundance, but clear-cut unequivocal evidence, backed up by specific cases, is scarce. I have no doubt that some of the opinion in question is correct; nevertheless, it cannot be accepted as scientific truth until the facts upon which it is based are brought forward and subjected to the search-light of modern genetics. Since this is the situation, whatever there may be of value in my talk will be largely in the impetus it may give some of you to accumulate much needed facts in this interesting and important field, rather than in the amount of information I can convey to you about inherited mal-position or other abnormalities of teeth and jaws. You orthodontists, of all people, since you are in position to get at the facts are the ones who can give us the most help here.

It is no exaggeration to say that during the last twenty-five years we have made greater progress in discovering the facts of heredity and in deter-

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mining the laws which govern them than in all past time. For accurate formulation of these laws biologists have resorted to carefully controlled experiments with plants and animals. The geneticist sorting out and assaying the various traits of his material reminds us of the chemist analyzing his compounds, and, like the chemist, he can often foretell the outcome of new combinations. He can add desirable characteristics or subtract undesirable ones.

With the rediscovery of the so-called Mendelian laws, in 1900, the subject of heredity became a real science; it passed at one leap from a realm of vague approximations to one of definite principles. And without going into details, I may say that the fundamentally important discovery in Mendelism is the unitary nature of inheritable characteristics and their independence in heredity. This fact that the parts or traits of an organism can be itemized into units which are not only independently heritable but independently variable, has been learned through the cross-breeding of forms which differ in one or more respects. The behavior of particular characters has not only been observed in the immediate progeny but has been followed into the succeeding generation when these offspring were mated with others of their kind or mated back to the parent types. In this way the germinal constitution of the individuals concerned has been formulated. Where there are contrasted characters in the parents, for instance, such as white plumage and black plumage in fowls, brown eyes and blue eyes in man, smooth coat and wrinkled coat in seed, horns and hornlessness in cattle, long fur and short fur in rabbits, beard and beardlessness in wheat, albino condition and normal condition, etc.—and in many cases the presence and absence of a given feature represent such a pair of alternate characters—there must obviously be a throwing together of the two traits in the resulting offspring of such parents. In the third generation, however, in the progeny of these offspring, the two distinct characters may be set apart again, thus showing that in the second generation while perhaps only one was visible, the factors which determine both were nevertheless present, and moreover, they were present in a separable condition.

In many cases it has been found that in the offspring of two individuals possessing such contrasted characters one of the pair of characters may overshadow the other completely or in part, although this is not necessarily true of all pairs of characters. Such an overshadowing is spoken of as "dominance" and the two characters in question are spoken of as *dominant* and *recessive* respectively. In certain cases the two unlike characters seem to unite to form a new character, or more commonly, what appears to be a blend, but even here we find that from the viewpoint of heredity the things which determine the two characters must persist as distinct entities, for we find each character appearing in its original condition in a definite proportion of the grandchildren, so that the apparent blending was only the temporary expression of cooperating though independent factors.

This illustrates the important fact that if we are to think clearly about matters of heredity we must discriminate sharply between the actual things

which are transmitted by means of the germ and the so-called character or trait we see expressed in the organism. A moment's reflection will show clearly that it is not the character itself which is transmitted, but something which will determine the character in the offspring, and this *something* in the germ is by the geneticist commonly called a *determiner* or *gene*. Not infrequently a given feature of a plant or animal is a product of the combined action of a number of genes and on the other hand, one gene may be influential in determining the aspect or condition of many different parts of the organism. Many traits of plants and animals—according to some geneticists possibly all traits—are inherited on such a unit basis or are capable of analysis into factors which are so inherited.

Since these facts hold for man no less than for other creatures we reach the important conclusion that the mingling of two lines of ancestry into a new individual is in no sense bringing them into the "melting pot" as it has been picturesquely expressed, but it is rather to be regarded as the mingling of two mosaics, each particle of which retains its own individuality, and which, even if overshadowed in a given generation, may nevertheless manifest its qualities undimmed in later generations when conditions favorable to its expression transpire. Concerning the germinal mechanism which brings about these segregations and recombinations of genes, there is a simple explanation but it would lead us too far afield to enter into it on this occasion. It is sufficient to say that any mature germ cell contains the gene of one or the other of a pair of similar or contrasted characters but not the genes of both. In other words, while because of biparental ancestry the body of a given individual contains a dual set of genes for the various parts, a germ cell bears only a single set of genes.

In the case of man, of course, we are unable to study heredity experimentally, hence we must resort to drawing up pedigree charts of such traits as we can observe, and comparing them with the tabulations of the behavior of heritable traits as determined by careful breeding experiments in the lower animals. When this is done it becomes evident that the factors which underlie the various characteristics of man's mind and body in all probability follow the principles of segregation and independent assortment as certainly as they do in the lower animals. We are really just beginning to make the proper observations and collect the necessary data with reference to the application of these principles to human traits. It is for this reason I find myself coming to you almost empty-handed as regards any accurate knowledge regarding the inheritance of dental and facial conditions. The necessary observations and records simply have not been made.

From the very nature of the conditions under which human records must be obtained, there is considerable chance of inaccuracy, and it remains largely for future investigators to build up a sufficient number of pedigrees to minimize errors and give us convincing evidence. We are handicapped at the outset in man by the difficulty of getting any geneologies at all, much less ones with correct data regarding particular personal traits. Most families keep imperfect records even of births and deaths, and most institutions

have little in their records that is helpful in following out hereditary conditions. Then in matters of disease we meet with the fact that many former diagnoses—to say nothing of present ones—were erroneous. In many cases of defect or of susceptibility to disease, a particular individual in the strain may have the basis of the trait in a transmissible or even an expressible form, yet it never comes to expression because that individual has been so fortunate as to escape the environmental stimulus which would call it forth. In yet other cases we are not sure of the paternity of a given child. Again, we are likely to be misled by the proportions which occur in the limited number of children of any given couple.

In the field of the orthodontist in particular there would seem to be unusual opportunity for study of the inheritance of malocclusion, dento-facial disharmonies, and the like, because of the conspicuousness of such defect, yet there is a dearth of well worked-out pedigrees of such anomalies. Here, it seems to me, is an opportunity that some of you should utilize. Records of the condition of which study is to be made should be obtained not only of the immediate family and its forbears but of collateral lines—uncles, aunts, cousins, and other relatives—whenever possible.

It might be well to mention certain errors into which one may fall in drawing conclusions from pedigree charts of traits, once these are secured. In the first place one must not forget the remarkable plasticity of a living organism, its proneness to distortion by extrinsic factors and its tendency to make compensatory adjustments. This must be particularly true of such constantly used structures as those of the masticatory apparatus and of such a mobile part as the lower jaw. If, then, some unusual feature reappears in successive generations, before we can pronounce it an inheritable trait we must make sure that it is not merely a condition which has been reimpressed on the individuals of each generation by the recurrence of some exceptional environmental condition. In some mining regions, for example, a well-recognized condition known as collier's lung results from constant work in the coal mines. If sons follow their fathers in becoming coal miners it is clear that they too may develop collier's lung, but obviously because of similarity in occupation, not because of heredity. I have no doubt that a "Chicago lung" characterized by accumulations of soot in the lungs due to constant breathing of a soot-laden atmosphere exists, and will occur generation after generation, as long as such pollution of the atmosphere continues in Chicago, yet heredity, of course, has nothing to do with the reappearance of such conditions in successive generations. The common misconception that deformities or postures associated with a trade, such as the shoemaker's or the tailor's, is genetically stamped on the offspring by the end of the third or fourth generation results from failure to discriminate between real inheritance and mere reappearances under similar condition of occupation.

In your own field of orthodontia, Dr. Dewey, in his *Practical Orthodontia,* has cited so many examples of what are probably acquired causes of malocclusion as to render further exemplification unnecessary. You doubtless recall that general health and all sorts of local causes from adenoids to thumb-

sucking may be responsible. In this field, then, although the distinctive traits are often easily observed, and reasoning from analogy one would expect to find a heritable basis for most of them, because of the very plasticity of the parts it is very difficult to determine what is hereditary, what acquired.

To add to the difficulty we are just beginning to find that the internal secretions of specific glands may play a very important rôle in determining the conformations of various parts of the body. From the viewpoint of heredity, therefore, a peculiarity in a particular structure might have its determining cause in the output of an endocrine gland, and if inheritance is involved the determining genes would be those responsible for the changed condition of the gland in question, not for the visible character we have under observation. Insufficiency of thyroid secretion during the growth period, for example, is known to have a characteristic effect on the bones of the nose and the base of the skull, producing a typical Mongolian facial type. Thyroid insufficiency may also be an important factor in dwarfing. The English anatomist Keith, in fact, is inclined to regard the primary differences which mark off the races of man as possibly due to the relative activities of various endocrine glands. Stature, for example, is largely regulated by the secretion from the pituitary gland, and Keith suggests that the average European is taller than the average negro or Mongolian because of the more pronounced activity of this gland in the Caucasian type. The pituitary also probably influences the character of the hair, the texture of the skin, and the cast of the features. The interstitial cells of the testes, or "interstitial glands" as they are often called, are apparently responsible for the secondary sex-differences. Judging from the more heavily haired condition and greater hairiness of the body in Caucasians, Keith likewise infers that this tissue is more active in them than in the Mongolian and negroid types. Again, he thinks that the lighter color of the paler-skinned races may have been produced by a greater activity of the adrenal glands since their secretion tends to destroy pigmentary bodies. As you know, destruction of the adrenals, as in Addison's disease, is accompanied by deposition of dark pigment in the skin of the patient. According to this hypothesis, then, the Caucasian type would be characterized by especially active pituitary, interstitial and adrenal glands.

I know of no data regarding specific dental effects of internal secretions, but since the character of the hair is subject to such influences it seems probable that the teeth also are, for the close correlation of hair and tooth anomalies has long been known.

The "Buddhas" of India may be cited as striking examples of such correlation. They are a toothless type of men, characterized also by baldness and peculiar sensitiveness to heat. There seems to be no question about the inheritability of this toothless condition and its associated defects. It does not follow the simple Mendelian ratio, however, but is apparently of that type known as sex-linked inheritance. And since it is possible that some of you, in your practice, may come across examples of this innate toothless condition, it may be well to digress a bit to see how such sex-linked traits behave. This type of inheritance sometimes termed "crisscross" heredity, has been likened to the knight's move in a game of chess. If toothlessness were the characteristic

in question, the condition would be transmitted from a toothless man through his daughter to half her sons. Or, to go into more detail, such a toothless father and a normal mother would have only normal children, but the daughters, although themselves normal, would transmit toothlessness to one-half of their sons. If, however, such a woman, who is really a carrier of the defect, should marry a toothless type of man, as might easily happen in a marriage between cousins, then as a rule one-half of her daughters as well as one-half of her sons will be toothless.

In such cases what appears to be a mysterious procedure becomes very simple, if we assume that the defective character is associated with the so-called sex-chromosome, which is supposed to be concerned in sex determination. This, however, is a technical matter into which we cannot enter on this occasion. If you encounter this peculiarity in any of your patients, I urge you to investigate it, by all means, since you may make a valuable addition to our all-too-scanty store of such knowledge.

As to other inheritable conditions which may be of interest to orthodontists, Castle, in his book on heredity, cites defective hair and teeth, or teeth alone, extra teeth, double set of permanent teeth, and harelip as examples of imperfect dominance, but he does not go into details. Likewise Davenport gives instances of the inheritance of extra teeth and of double sets of permanent teeth, and mentions harelip and cleft palate as imperfect dominants in inheritance. The opinion that harelip may be hereditary is borne out by breeding experiments on dogs which sometimes show a closely analagous condition. It is not improbable, however, that both harelip and cleft palate may also occur as the result of adverse intrauterine conditions which are not hereditary in nature.

As to caries, it is plain that the disease as such cannot be inherited. If there is any inheritable basis for the condition it must be of the nature of some insufficiency which makes the teeth unusually susceptible to the infection. Racial differences in the frequency of dental caries are often cited as evidence of inborn differences of resistance. This may be true, but it cannot be accepted as valid evidence until such other possible factors as differences in food-habits and other differences in the conditions of life have been excluded. As long ago as 1878 we find Magitot in his *Treatise on Dental Caries,* pointing out that negroes and Arabs are most resistant to dental caries, Caucasians least so, while Mongolians are midway between. Icelanders are almost immune. In France, he maintains, Cymric stocks show more cases of caries than other Celtic stocks. Ancient Egyptian skulls bear little evidence of caries, and teeth in the skulls of aboriginal races of America, Australia, New Caledonia, Java, Malay Islands and Madagascar show none.

Absence of certain teeth, or dental agenesia, seems, in some cases at least, to be a hereditary characteristic. Thus, as early as 1870 we find McQuillen citing cases of hereditary lack or dwarfing of the lateral incisors of the upper jaw. In an abridged translation of a study of Dr. Sergi of Rome, Italy, in the *Journal of Heredity* for December, 1914, is found an account of Dr. Sergi's own observations on the inheritance of this condition, together with reference to the observations of others. Dr. Sergi reports, for example, the case of a youth with congenital absence of the upper lateral right incisor whose father,

uncle, paternal grandfather, two brothers, and two sisters also showed the same defect. In all of these individuals there was also a noticeable reduction in the size of the corresponding incisor of the left side. In general, in dental agenesia the lateral incisors and the third molars or wisdom teeth are the ones most frequently absent. As to the cause of this, Sergi apparently accepts the proposed explanation of Amadei, who attributes it to evolutionary changes in man associated with changes in his habits of eating. To quote Sergi directly as translated in the article referred to:

"Amadei in 1881 proposed the hypothesis that the same movement of evolution which tends to cause the disappearance of the last molar would make its action felt on the entire jaw, but particularly at its two centers of reduction: one corresponding to the location of the third molar and the other at the point where the lateral incisor is located. This is the weak point because of orthognathism, and because of the tendency of the maxillary arch to become constantly more acute.

"The phenomenon appears as a form of transition, in the subject which I examined, because one of the incisors is lacking and the other very slightly reduced in size, while the teeth between seem to attempt to compensate, by their notable increase in size, for the inadequate development of the laterals. To confirm this idea, it is sufficient to record an easily observed fact, and that is the frequency with which, in the skulls of civilized peoples, the upper medial incisors appear much enlarged and those beside them much reduced, a difference which is also observable in the skulls of prehistoric peoples. This morphological condition is an indication of the modified functional conditions to which man's teeth are subjected in comparison to those of the other vertebrates nearest to him in anatomy and relationship. The function of the incisors is essentially the seizing of food, and particularly the separation (*incidere*) of the part which is to be taken in the mouth, from that which remains in the hand; this function is preceded and then assisted to the highest degree by the canine teeth, which have to seize and hold the prey during the time necessary for the *incisive* operation; the canines also have a special function as a weapon of offense and defense. In man this last function of the canines is abolished, while that of seizing is largely reduced in importance, particularly among civilized peoples; for these reasons the canines no longer project below the plane of the other teeth, and to that extent lose the characteristic pointed form which they have in other genera of vertebrates. When man eats, he first divides the food for chewing, principally by the use of his medial incisors and to a less extent with the lateral incisors; and particularly with those of the upper jaw, since it projects forward of the lower one. The food is then pushed into the mouth for mastication, and from then on the work of the lateral incisors and canines is very slight. The width to which man opens his mouth is small in comparison with its aperture, and in comparison with the habit of other vertebrates; this is because of his orthognathism or lack of 'muzzle' and because of a diminution of his voracity, which leads him to introduce into his mouth only a small quantity of food at one time; these facts favor the action of the medial incisors and diminish the importance of the other incisors and the canines; the

result is that the superior lateral incisors are now an organ subsidiary to the medials.''

This suggested explanation, of course, opens up the old contention of whether the changing food habits of man have induced hereditary modifications in his dental apparatus, or whether chance hereditary variations which have sprung up in the latter have led to changes in his food habits. Into this troubled pool of controversy, we cannot dip today, and I shall have to content myself with merely pointing out that there are two sides to the question.

Dental agenesia is not confined to man. Professor Cole, for example, in the *Journal of Heredity* for October, 1919, describes a case of dental deficiency in a herd of Holstein-Friesians in which the incisors (confined to the lower jaw in cattle), instead of being sharp and flat, were conically blunt and too few in number. Along with the imperfectly formed teeth there was a deficiency of hair. The hair was too short on the neck and head and, in consequence, the affected animals had a semidenuded appearance. The condition was observed first in several calves but it was found later that their sire had such teeth. Since the bull had not been raised on the farm where the defective calves were born, and inasmuch as the latter had lived along with a number of normal calves under practically the same conditions of environment, Cole thinks that the anomaly must have a genetical cause.

The reappearance of faulty enamel in successive generations is also a condition which may have a hereditary basis. Thus Davenport, in his book on heredity, refers to a family strain in which the existence of faulty enamel, giving rise to so-called ''brown teeth'' was of frequent occurrence. The chart which accompanies his description shows three generations of fifty-eight individuals in all, in which twenty-two had the characteristic defect.

Regarding inheritable types of facial disharmonies we have little or no evidence. Doubtless such occur, but we cannot affirm this positively until adequate records have been made and studied from the standpoint of genetics. That pronounced mutations occur in the conformation of the face of lower animals and that such changes are permanent—that is, inheritable—is well known. Such a characteristic mutation is seen in the jaw of the bulldog or the pug dog. It has also been recorded in the fox. Even a well developed race of ''bulldog'' cattle which bred true was observed in South America by Darwin on his famous voyage of the Beagle. He describes these cattle as having short, broad foreheads, upturned nostrils, and an upwardly curved lower jaw which projected beyond the upper jaw. The upper lip was so drawn back as to expose the teeth.

Dr. Hooton, an anthropologist at Harvard University, after a study of the effect of race mixture on physical characters, concludes (*Scientific Papers of the Second International Congress of Eugenics*) that ''It seems probable * * * * that in case of race mixtures morphological features are inherited by the offspring in small units from both parent stocks.'' While recognizing the lack of a sufficient body of evidence fully to substantiate such a conclusion, he is inclined to believe that the teeth of negroid types are characterized by certain peculiarities of form and a condition of the enamel which usually gives them a bluish or yellowish tinge, and that these negroid features persist in

negro-white mixtures. He asserts that the form and proportions of the nasal bridge and nasal aperture are hereditary. He points out that negroid or mongoloid races are characterized by a primitive low and broad nasal bridge and says that hybrids between such a race and a race with high, narrow nasal bridge usually approximate the latter nasal form. According to him elevation of the nasal bridge is generally the most striking effect noticeable in a cross between a European and a low-nosed race, although he goes on to say that "the primitively broad nasal apertures seem to be less readily affected by such crossings." He pronounces the protrusion of the jaws known as *prognathism,* a simian reminiscence, and finds that crossing of prognathous and orthognathous races invariably results in a shortening or sometimes in a complete disappearance of this jaw-protrusion in the hybrid. Even a small admixture of the blood of a short jawed race tends greatly to lessen negro prognathism.

In most primitive, hard chewing peoples, such as the Eskimo, he finds an increased palatal area, brought about by enlargement of palatal breadth. He regards the extreme specialization of the masticatory apparatus as being an important determining factor in the head form of such a type as the Eskimo which is characterized by a long, narrow, and high cranium.

Considerable interest has arisen lately in the question of whether or not pronounced racial intermixtures such as we have here in America may not result in such disharmonies of parts as to constitute a serious physiologic evil in many of the progeny of such crosses. Since it is impossible to settle the question on the basis of our present knowledge, it is not surprising to find widely differing opinions, even between men of equally high standing in genetics. Thus we find Davenport, Director of the Station for Experimental Evolution at Cold Spring Harbor, New York, in an article on *The Effects of Race Intermingling (Proceedings of the American Philosophical Society, 1917),* although warning us that the subject has not been sufficiently investigated, making the following statement:

"Turning to man, we have races of large tall men, like the Scotch, which are long-lived and whose internal organs are well adapted to care for the large frames. In the South Italians, on the other hand, we have small short bodies, but these, too, have well adjusted viscera. But the hybrids of these or similar two races may be expected to yield, in the second generation, besides the parental types also children with large frame and inadequate viscera—children of whom it is said every inch over 5′ 10″ is an inch of danger; children of insufficient circulation. On the other hand, there may appear children of short stature with too large circulatory apparatus. Despite the great capacity that the body has for self adjustment it fails to overcome the bad hereditary combinations.

"Again it seems probable, as dentists with whom I have spoken on the subject agree, that many cases of overcrowding or wide separation of teeth are due to a lack of harmony between size of jaw and size of teeth—probably due to a union of a large-jawed, large-toothed race and a small-jawed, small-toothed race. Nothing is more striking than the regular dental arcades commonly seen in the skulls of inbred native races and the irregular dentations of many children of the tremendously hybridized American.

"Not only physical but also mental and temperamental incompatibilities may be a consequence of hybridization. For example, one often sees in mulattoes an ambition and push combined with intellectual inadequacy which makes the unhappy hybrid dissatisfied with his lot and a nuisance to others.

"To sum up, then, miscegenation commonly spells disharmony—disharmony of physical, mental and temperamental qualities and this means also disharmony with environment. A hybridized people are a badly put together people and a dissatisfied, restless, ineffective people. One wonders how much of the exceptionally high death rate in middle life in this country is due to such bodily maladjustments; and how much of our crime and insanity is due to mental and temperamental friction."

Davenport was led to his conclusion, in part at least, from certain results he obtained by crossing Brahma and Leghorn fowls. The Brahma becomes broody two or three times a year and makes a good mother, but is only a fair layer. The Leghorn, on the contrary, is a poor mother but an excellent layer. "The hybrid," says Davenport, "was a failure both as egg layer and as a brooder of chicks. The instincts and functions of the hybrids were not harmoniously adjusted to each other."

On the other hand, Professor Castle, Geneticist at the Bussey Institution of Harvard University, sees no danger in mixed races. He says:

"Crosses made between the largest and smallest known races of rabbits, one weighing three times as much as the other, produced cross-breds which were remarkably vigorous and prolific, intermediate in size between the two parent races, and later generations showed no return to original size of the pure parent races. The inheritance of size depends on factors which are general, affecting all parts of the body. A rabbit of large weight also had long skull, long ears and long leg bones to match the great weight, and a rabbit with short ears was invariably of small general size. We may dismiss as groundless the fear that a mixed human race will necessarily contain physical features of unbalanced proportions. As a matter of fact, some of the best human stocks have arisen as race mixtures. The tall Scotch, and the short stocky Welsh are relatively unmixed ingredients of the intermediate but not less successful English type."

In conclusion, then, as regards the question of inheritance of certain types of dental and facial anomalies, shall we probably not have to bring in the verdict of guilty though not proven? The presumption, it seems to me, is strongly in favor of there being an inheritable basis for many of the disharmonies and malformations encountered by the orthodontist, although unquestionably such plastic and active parts as the jaws are liable to pronounced modifications by extrinsic factors. The field is before you. It remains for you orthodontists to find and chart the cases and help us sift out what is truly hereditary from what is merely acquired.

PRODUCING MALOCCLUSIONS BY ORTHODONTIC (?) TREATMENT

By L. J. Porter, D.D.S., New York City, N. Y.

A RATHER interesting case came into my office about two years ago and the patient was introduced to me in a very peculiar way. While this case is not so unusual, perhaps it may be called rather spectacular.

The telephone introduction of the boy by his dentist was indeed amusing, for it seemed that the dentist's practice had so tremendously developed, that he was unable to take the time to finish the treatment of this boy's teeth on which he had been so admirably working for a course of two and a half years. This telephone conversation, of course, rather prepared me for a temporary shock. I was doubly surprised to see the dentist enter the office, not only with the boy, but with the original models taken before the boy started treatment. That, of course, was very fair and was the honorable thing to do, and yet the fact that he could let the boy and his parents see the "was" and "is" of the thing was proof to me that the man was crazy.

Fig. 1.

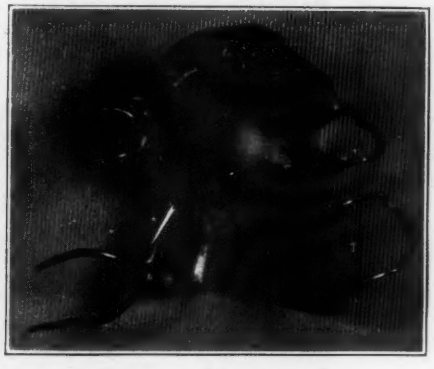


Fig. 2.

Originally the boy had fairly good teeth. At this stage of the game he looked like an "inverted bulldog." But the dentist smiled and said, "You see, Doctor, I have gotten the case this far along and I would like to have you finish it for me." Well, I felt like telling him that it was already about "finished" and that if he worked much longer the boy would be completely "finished" and die of indigestion due to induced or produced lack of occlusion.

I finally started on the case as I decided I surely could not do any more harm than had already been done.

Fig. 1 shows the models made by the dentist before he started the case. Fig. 2 shows the appliance used for treatment. This consisted of a rubber bite plate with lateral springs (fourteen gauge) for opening up the space

for the eruption of the maxillary right second premolar, which was originally impacted.

This was without a doubt an excellent appliance to do this work, for not only did it open up seven millimeters which was required, but it kept right on with the good work and by the time I caught it, there were thirteen millimeters for the desired eruption. But we hauled in the main sail and slowed her down to twenty knots an hour and we found upon removal that the fourteen-gauge springs were set to open up to about sixteen millimeters.

I decided that a little relapse might be a good thing, but of course I did not want Nature and muscles to get all the credit, so I engineered an appli-

Fig. 3.

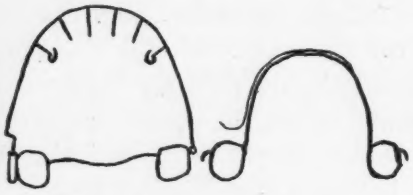


Fig. 4.

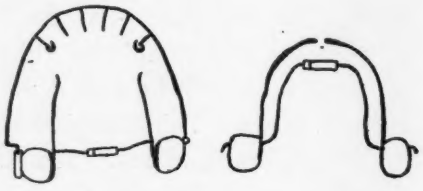


Fig. 5.

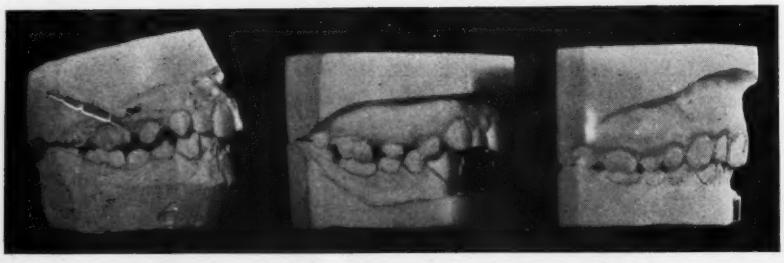


Fig. 6.

Fig. 7.

ance which might move with the teeth as they returned to their original positions. With this appliance I finally decided to use intermaxillary rubbers, and although these were largely used to hasten the relapse, they also served as a sort of crude limitation. Dr. Mershon had just finished telling me and also had published an article to the effect that if a tooth movement is started in any direction the tooth will continue to move to some extent in that direction even though the appliance be removed. This of course started me to thinking, for I desired if possible to keep the boy's teeth within a short distance of the oral cavity at least.

On a closer and more serious examination I found the original diagnosis should have been as follows: Slight bilateral posterior occlusion with a decided mesioversion of the maxillary right molar causing an impacted maxillary right second premolar, a deep overbite together with a lingoversion of the mandibular anteriors causing an impacted mandibular left premolar.

After two and a half years of treatment by the dentist the mandibular teeth had not been touched, but the maxillary right molar had been moved posteriorly to relieve the impacted maxillary right second premolar (Fig. 3).

Fig. 8-A.

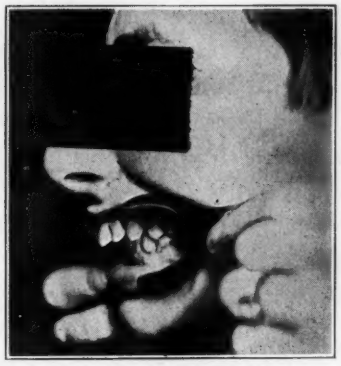


Fig. 8-B.

Fig. 9.

This movement was perfectly correct, but it should have been limited, as it not only moved the molars, but also moved all the anterior teeth decidedly forward.

The appliances I decided to use for correction are shown in Fig. 4. The maxillary molars were stabilized with a soldered lingual wire and a horizontal round tube placed on the buccal of the maxillary right molar and a vertical round tube on the maxillary left molar, which made a sort of rotary axis at this point. A high labial of the ordinary type was used with intermaxillary hooks. On the mandibular teeth was a soldered lingual arch with a spring attached to open up the premolar space on the mandibular left. Hooks were placed on the mandibular molars to be used with number seven rubbers. These appliances were used for about fifteen months, when I added a Varney

Barnes tube to both the maxillary and mandibular appliances to get more expansion, as shown in Fig. 5. The high labial appliance was continued with this change of lingual appliances.

Figs. 6 and 7 show the three stages of the case, the latter picture being taken after two years' treatment in this office. It is not quite finished, but it at least approaches a favorable aspect. The changes in the boy's teeth as seen in Fig. 8 show the hideous condition after his first orthodontia experience, and Fig. 9 shows the final result.

I do not mean by this article to criticize the dentists' treatment of orthodontic cases, for I know there are some men who are doing splendid work along these lines, but if one attempts such a case he should be reasonably sure that he can detect trouble before he gets in too deep. In other words, we should never be like the Italian workman, who came running to his foreman and said, "Come queek, bringa de shov' an' de pick, Carlo he stuck in de mud up to hees knees." "Let him walk out," answered the foreman. "Oh, he can't fer he's wrong end up," called the workman as he ran to help his comrade.

The boy is thankful to be able to walk upright again without striking terror into the hearts of his close neighbors. On the other hand, I am sure we can all sympathize with the dentist with his huge practice, for sometimes when I see some of my "would if I could be" beautiful cases I feel that I, too, have not enough time to complete their work (at least not time enough before they die of old age), but I hope to get retainers on all of them within fifty years whether their teeth are beautiful or not.

PRACTICAL PEDODONTIA, OR JUVENILE OPERATIVE DENTISTRY, AND PUBLIC HEALTH

By Floyde Eddy Hogeboom, D.D.S., Los Angeles, Calif.

(*Continued from May issue.*)

CHAPTER VIII

PROSTHETIC APPLIANCES FOR CHILDREN

PECULIAR conditions arise in which a prosthetic appliance is called for in growing children. Our modern mode of living leads to accidents of all sorts, among which are automobile accidents with many facial disfigurements.

I. SPACE RETAINERS (Fig. 58)

More often as the result of caries a deciduous tooth may be lost before its proper time. This condition calls for a space retainer to maintain the proper relationship of the surrounding dental structures.

Fig. 58.—Space retainer, maintaining space after loss of first deciduous molar.

A general rule is that if a deciduous tooth is extracted a year or more before its average exfoliation time, a suitable space retainer should be employed.

Technic for Making Space Retainers.

1. Compound impression of the side of the involved teeth;
2. Cast in Healy's artificial stone;
3. Cut out the tooth to be extracted from cast;
4. Band teeth on either side with 33 gauge gold banding material;
5. Solder 14 gauge gold wire between bands;
6. Cement in place.

It is better to take the impression before the teeth are extracted as the

little patient is more easily handled and the band can be placed earlier. From time to time the wire bar is pinched with wire stretchers, to accommodate growth.

II. PLATES FOR MISSING CENTRALS (Figs. 59, 60)

Very frequently the upper centrals and laterals are lost in accidents of various kinds. It is obviously impossible to place a fixed appliance until the jaws have reached their full growth. In cases of this kind a so-called "horseshoe" vulcanized plate is made. Teeth of proper shade and size are selected and vulcanized on the plate. The plate does not need to cover the vault of the mouth, but only over an area of one-half inch next to the teeth.

Fig. 59.

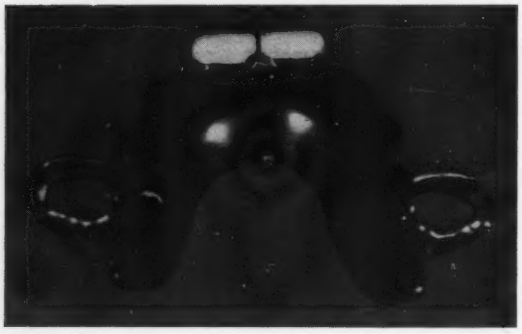


Fig. 60.

Figs. 59 and 60.—Plate for missing central incisors. In this case the boy had lost his central incisors due to an accident. It was necessary to place a "horseshoe" plate carrying the replaced teeth. Two second deciduous molars were banded to receive 18 gauge round wire clasps, as there was no other means of securing retention.

From time to time the patient must report and see that the plate is not in any way interfering with proper development. If clasps are used, they should be made of 18 gauge round wire with the least area involved. A new plate may be called for as the child's bones enlarge. Very little stress should be exerted by the clasps as it then becomes an orthodontic appliance.

III. "MOVIE" PLATES

The moving picture industry employs many children at an age when their deciduous centrals are lost and the permanent centrals are not fully in place.

A plate of horseshoe variety is supplied with proper clearance for the erupting teeth. The plate must not be worn except when the child is in the

pictures, as it is not a normal condition and may hamper the eruption of the permanent teeth.

IV. REPLANTATION

The matter of replanting a permanent tooth displaced by an accident is of doubtful success. The condition presented by the patient is the only basis upon which a success or failure depends and calls for judgment and extreme care.

CHAPTER IX

DENTAL PROPHYLAXIS

Under dental prophylaxis we shall consider the phase devoted to childhood. Perhaps "oral hygiene" would more amply cover this question.

Office Prophylaxis.—Children's teeth are very frequently covered with a pigmented scum or stain called "green stain." The theory is that this may be some remnant of Nasmyth's membrane which enmeshes particles of food and debris. Chromogenic organisms develop in this covering and give it that characteristic appearance. This membrane acts as a dializing membrane if not removed, and a chalky appearance of the enamel is often revealed after removing the so-called green stain.

In cleaning a child's mouth the teeth are first surveyed for calcareous deposits, which in young children are seldom present. These are first removed. Then with small rubber cups the entire gingival parts of the teeth are carefully gone over. Following this small, stiff brush wheels are used and in inaccessible parts the porte polisher is employed.

Iodine disclosing solution is sometimes used. It is not meant to be used, however, as a "sales agent" or to scare parents, as all too frequently it appears to be used.

If the stain is very tenacious, strips and fine discs are often necessary to clean the enamel surface. Frequently the white chalky part can be ground slightly and polished giving a fresh enamel surface.

Home Prophylaxis.—Fifty per cent of the hygienic condition of the mouth depends on the patient. The child should have a good standard child's tooth brush and not a finger nail brush.

The very young children will do well if they are taught to use only warm water and to brush correctly. As the child grows older he may be given either a paste or powder. To my mind it is of greater importance to teach that the essential point is the mechanical cleaning and not the various virtues of the powders or pastes. One soap will clean hands and ears as well as another if enough "elbow grease" is used with it. After breakfast and before going to bed are perhaps the best times to clean the teeth. The child is away at school practically all day and is seldom able to clean the teeth after lunch. By taking a mouthful of water and forcing it back and forth through the teeth very much good is accomplished.

The inclusion of proper fruits in the lunch will assist in maintaining a proper condition of the mouth by their influences on salivary reactions.

CHAPTER X

PUBLIC HEALTH AND DENTISTRY

The evolutionary stages of dental science have brought us face to face with many problems, some of which have been solved and some of which are in a process of solution. We have probably all read of the remarkable work in the Bridgeport, Conn., schools by Dr. A. C. Fones and his corps of dental hygienists. We have read with amazement of the 50 per cent drop in retardations, and of the remarkable decrease in communicable diseases and the resultant health standards. Our dental literature is full of articles on oral

PASADENA DISPENSARY

Clinic Record No. _____

Name _____ Age _____

Address _____ Date _____

Father's Name _____ Nationality _____ Age _____

Mother's Name _____ Nationality _____ Age _____

Final Diagnosis _____ Tentative Diagnosis _____

History by _____

A--FAMILY HISTORY: B--PAST HISTORY: C--PRESENT HISTORY: D--PHYSICAL HISTORY: E--TREATMENT

Fig. 61.—Representative clinic record.

hygiene showing the results of health programs. We also hear of the remarkable results of eliminating foci of infection and its relation to communicable diseases. These are all the evidence of a search for better health. Today we are faced with a problem which, perhaps in its magnitude, involves every problem of dentistry, and that is the relation of dentistry to public health.

There is a distinct difference in the viewpoint of the dentist in private practice and the dentist who is in public service. The former has the question of overhead and fees to contend with. The latter has very little except his altruistic spirit to keep him headed toward the ideal. It is becoming more apparent every day that these two divisions of dentistry must work in

Pasadena Dispensary—Social Service Record

File No.
Date

Name | Age | Birthplace | S. M. W. D. Sep.
Address | How Long in U. S. | in | Settlement
Occupation | Phone | | M. F.
Nationality | Church | | U. S. Citizen
Referred by | School

FAMILY	KIN	DATE OF BIRTH	BIRTHPLACE	ADDRESS	OCCUPATION OR SCHOOL	WAGES	INSURANCE	DISP. NO.

Home Investigated

ECONOMIC SITUATION

INCOME AND ASSETS	EXPENSES AND DEBTS
Salary	Rent
Other Income	Insurance
Average Monthly Income	Instalments
Time Worked in Past Year	Groceries, etc.
Savings	Lodge or Union Dues
	Average Monthly Expense
	Debts

Physician

Remarks:

C. E. of I. Sig._____

Fig. 62.—Representative social service record.

harmony. The public health service is educating the masses. These masses are demanding better dentistry, and so it is with the idea of giving the man in private practice and the oncoming young dentist a better idea of the public health service that this chapter is given. I shall include the study of dispensaries, hospital service, and school dental supervision.

A *dispensary* is an institution in which ambulatory patients may receive diagnosis and treatment of human diseases by a specially organized group of ethical, medical and dental practitioners (Figs. 66, 68).

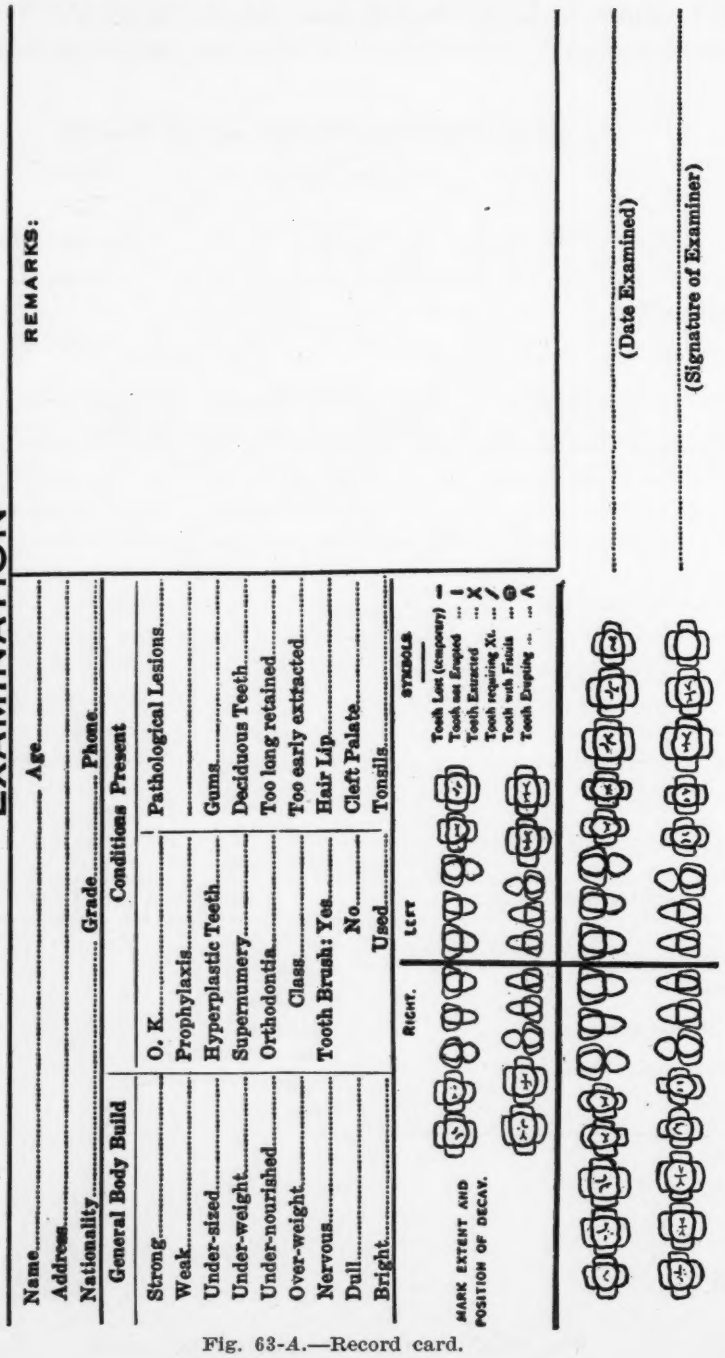
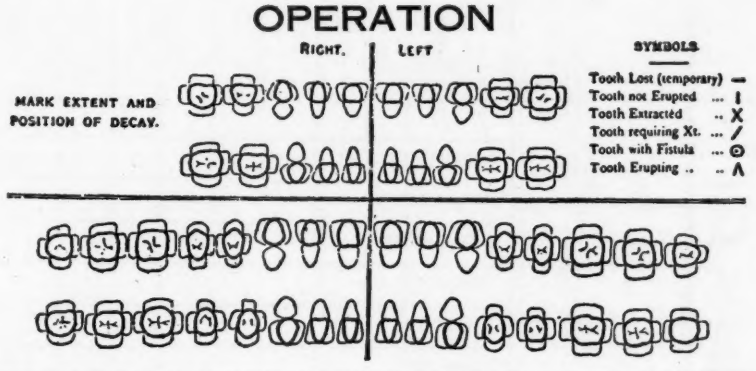


Fig. 63-A.—Record card.

The *clinic* is a subdivision of a dispensary dealing with related diseases (Figs. 67, 70).

With these two definitions in mind we find that the first dispensary was organized in London in 1687, following the great fire of 1665. The poverty and misery were so widespread that the physicians took steps to organize their profession into a working group which would devote some time to the relief of public misery. Their first thought was of dispensing drugs to the



Date	Location	Service

Fig. 63-*B*.—Reverse side of Fig. 63-*A*.

poor and that was practically their scope of work. But the years have brought many changes until now the dispensary is no longer a medical soup kitchen, but a great clearing-house for social service. The charity sting has been removed by proper sliding scales of fees. The majority of patients pay some fee and, strictly speaking, there is no longer any dispensing of charity.

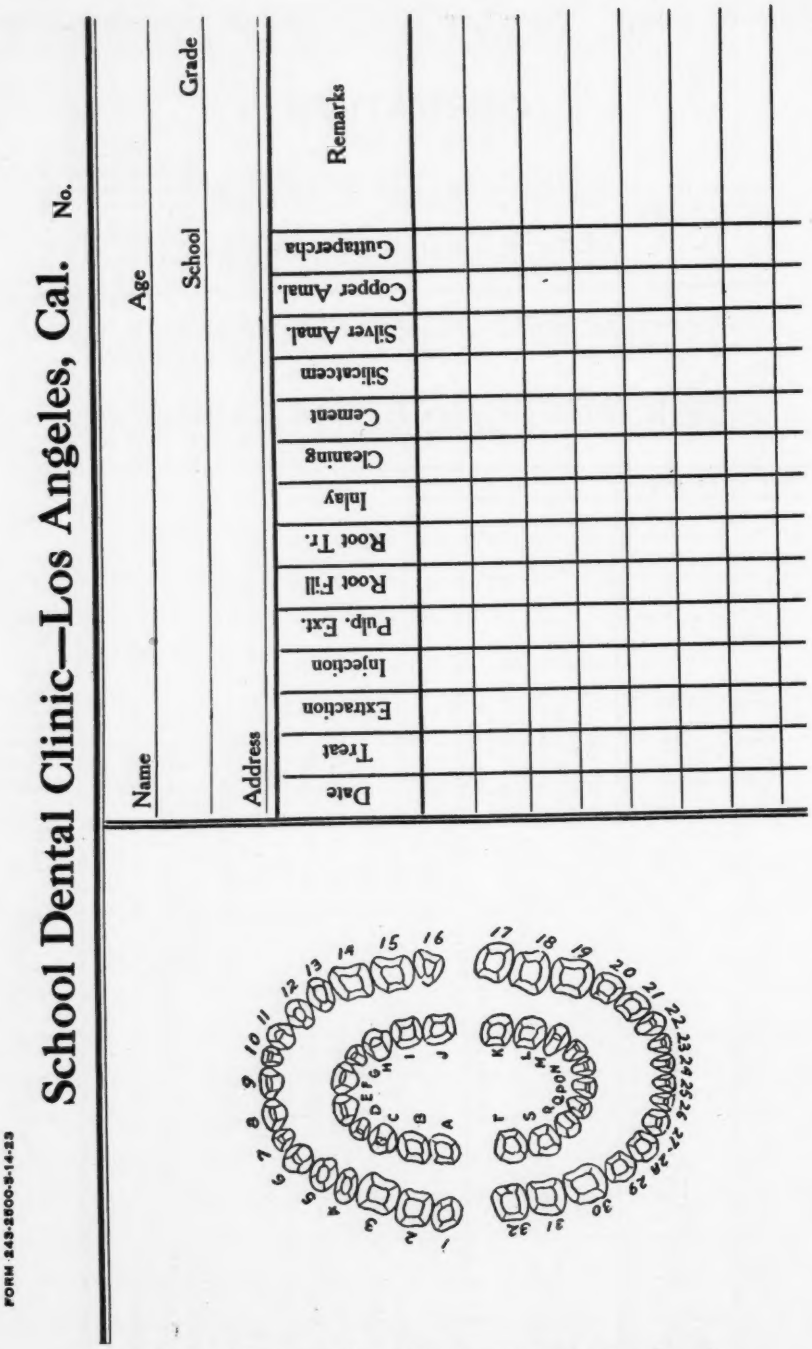


Fig. 64-*A*.—Representative school dental clinic record card.

We have found that the patient's self-respect is kept up by a small fee, and so it has gradually come about that the dispensary takes a vital part in the community life. In classifying dispensaries, I shall give the one outlined by Davis and Warner.

Date	Treat Tooth	Extraction	Injection	Pulp Ext.	Root Fill	Root Treat	Inlay	Cleaning	Cement	Silicatcem	Silver Amal.	Copper Amal.	Guttapercha	Remarks

Fig. 64-*B*.—Reverse side of Fig. 64-*A*.

Form 248—4M—2-1-23

PUBLIC SCHOOL DISPENSARY
936 YALE STREET

*Los Angeles, Cal.,*_____*19*___

*TO THE PRINCIPAL*_____*School*

_____ *a pupil of your school, has an appointment at the DENTAL CLINIC*

_____

Kindly arrange for this pupil to be present at the Clinic at that date and hour.

_____*D. D. S.*

Form 600—4-24-23

PUBLIC SCHOOL DISPENSARY
936 YALE STREET
Los Angeles, Cal.,_____**192**___
TO THE PRINCIPAL

_____

_____**has had the**
(For Pupil's Name)
dental work completed for the present. Urge that good care be taken of the teeth. Please send this card home to the parents.

The pupil will not need to return ☐
Should return in three months ☐
Should return in six months ☐
Should return in one year ☐

_____**School Dentist.**

Fig. 65.—Cards used in the Los Angeles Public School Dispensary.

CLASSIFICATION OF DISPENSARIES

I. As to Medical Scope:
   General (treating all diseases).
   Special (Confined to one or a few specialties).
II. As to Relation with Other Medical Institutions:
   (a) Out-patient departments (of hospitals).
   Out-patient institutions (separate from a hospital).
   (b) Teaching (medical students).
   Nonteaching.
III. As to Public Function:
   (a) Clinical medicine primarily.
   Prophylactic work primarily (Public Health Dispensary).
   (b) District dispensary (serving a definite area).
   Dispensary unrestricted as to area.

ELIGIBILITY

The question of eligibility of patients to dispensary care is a moot question. It is one on which many questions of social economics involving delicate and far-reaching consequences depend. The social service department of the

Pasadena Dispensary has worked out a basis for admitting patients which comes under one or more of the following reasons:

1. Financial conditions which place the patient in the poverty class.
2. Financial conditions in which the patient is just above the poverty line, and any debt incurred would precipitate him below the poverty line.
3. Indications of long time of treatment required and no prospects of meeting obligations.
4. Past illness in family in which debt has been incurred and further physical remedy would not be sought were clinics not available.

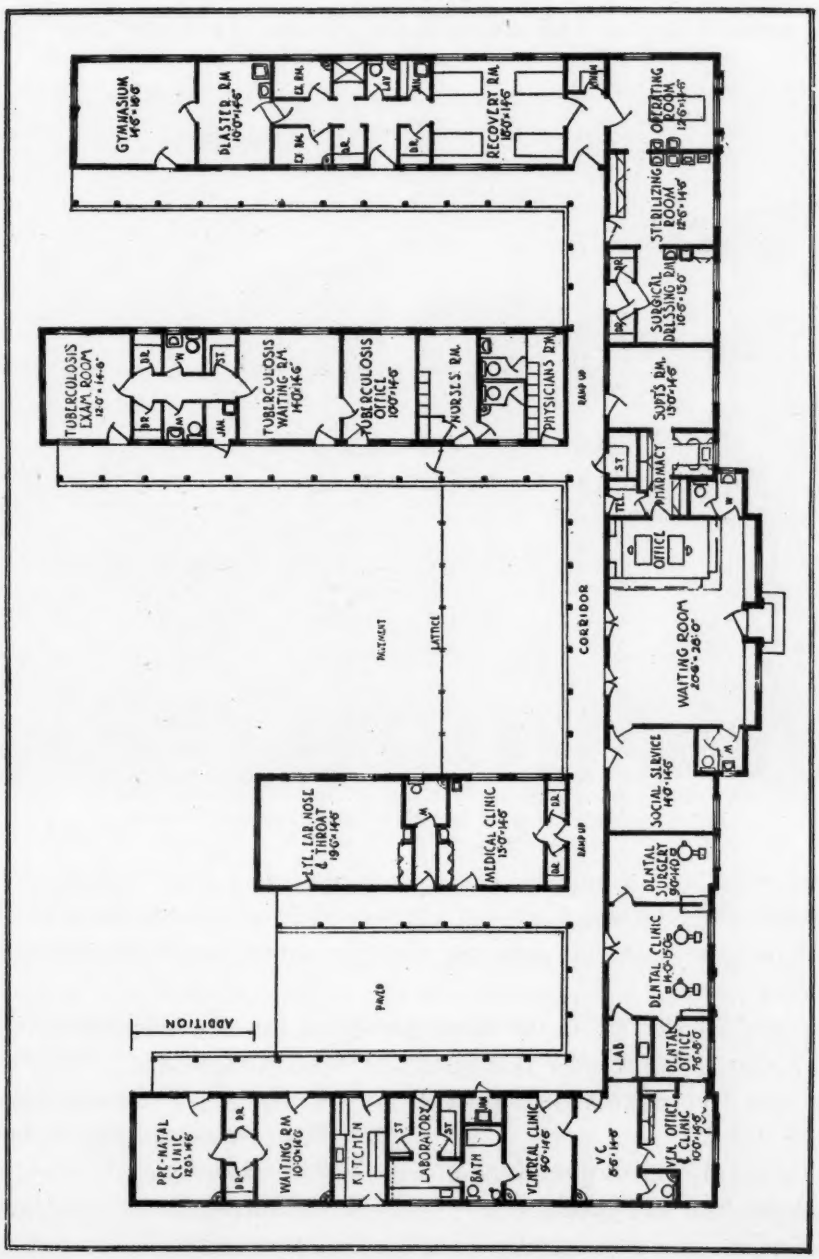


Fig. 66.—Floor plan, Pasadena Dispensary, Pasadena, Calif.

5. Patients whose finances do not point toward relief, and whose mental capacities do not grasp the necessity of remedial measures. This last group of patients requires the most intense and painstaking of preventive work the dispensary can possibly give.

This grouping is necessarily broad in its scope and requires elasticity in application. The social service worker applies these rules as best she can with the sole idea in mind of the greatest good to all.

DISPENSARY DIVISIONS

The dispensary must be headed by a *board of directors or trustees.* These in turn select a competent *superintendent* who handles the business, supervises the student nurses, and manages the clinics. In larger organizations it

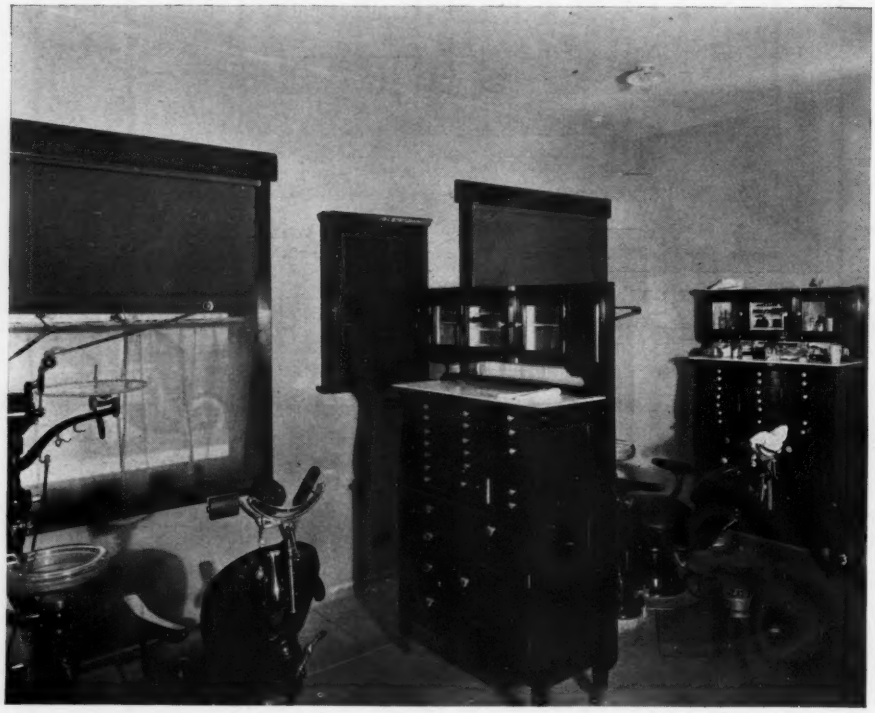


Fig. 67.—Main room of Dental Clinic, Pasadena Dispensary.

is necessary to have a *business manager* as well as a superintendent. In one case the president of the board of directors gives her full time to the business management. In this way the superintendent can supervise the clinics and student nurses.

The *staff of doctors* is the next group, in the plan, to study. There is usually a chief-of-staff who is elected for a term of office. Associated with him are men who devote time to some one specialty. The usual clinics are:

1. Dental.
2. Venereal and dermatology.
3. Pediatrics and prenatal.
4. Medical and psychopathic.
5. Surgical.
6. Eye, ear, nose, and throat.
7. Tuberculosis.
8. Orthopedic.
9. Gynecologic.
10. Social service.

The *social service* is not strictly a division of this staff. It is rather a clearing-house for all departments. There are usually two or more doctors in each division, and as we are interested in the dental division I shall outline the way in which the dental department is planned.

It is necessary to have one man who is the *chief in the dental department.* It is also well to have a *committee selected by the dental society* in his locality to act in an advisory capacity, pay any bills, and serve as directors.

In discussing such a subject as public health from the standpoint of dentistry let us divide the discussion into three divisions:

I. Adult work for the class of individuals of minimum circumstances.

II. Children's work in the public schools.

III. Dispensaries or Clinics.

Fig. 68.—Pasadena Dispensary—view from one of the patios.

I.

ADULT WORK FOR THAT CLASS OF INDIVIDUALS OF MINIMUM CIRCUMSTANCES

The *type of service* should be simple, and perhaps rather radical, because one is dealing with a class who do not always comprehend the value of the service. Dr. Millberry, in an essay entitled "Dental Service for the Other Eighty Per Cent," delivered before the National Dental Association at New Orleans, said of the dispensary service, that it should be:

1. Primarily preventive in character.
2. Restorative and corrective where necessary.
3. Available in terms of the means of the individual, and at times or under conditions which will not impair the income.
4. Conveniently accessible to the majority.

5. Supplemented by truthful information, and divorced absolutely from charity.

There are certain *special phases* of work for which provision must be made. For instance, it is necessary to make prosthetic appliances of simple construction, and provide for those cases of malocclusion that the orthodontist cannot care for in his private practice. The children have to be cared for.

Histories are, of course, absolutely necessary. It is becoming more evident that we would be better dentists if we were better diagnosticians. A good history is half of the diagnosis. The histories cover the details of living, previous conditions, financial conditions, etc. These histories are a means of classifying patients who are eligible and who are not eligible.

Fig. 69.—Pasadena Dispensary—recovery room.

Many times it is necessary to send the patient to other departments for treatments of various kinds. In this way the dentist becomes more of a physician, and the physician becomes more of a dentist.

II.

CHILDREN'S WORK IN THE PUBLIC SCHOOLS

This part of the problem of the public health promises to be the most interesting and productive of results.

Here we strike at the beginning evils. We attempt to head off the oncoming results of neglect and their sequelae. We attempt to ward off diseases of later life by carefully shielding the growing child and tactfully educating the parent at the same time. Let us divide our methods into three

groups: first, educational; second, public school examinations by dentists; third, clinical work.

In the *educational* work we use pamphlets largely, written in simple, plain language in question and answer form. The pamphlets are sent home with the child that needs attention, with the hope that the parents will read them.

Class room lectures with charts is an ideal method to teach the child. Public spirited dentists who have the gift of teaching should form classes and learn some of these fundamentals in plain language, so that when the opportunity is open there may be those who, under the auspices of a recognized institution or society, can at once undertake the work. The opportu-

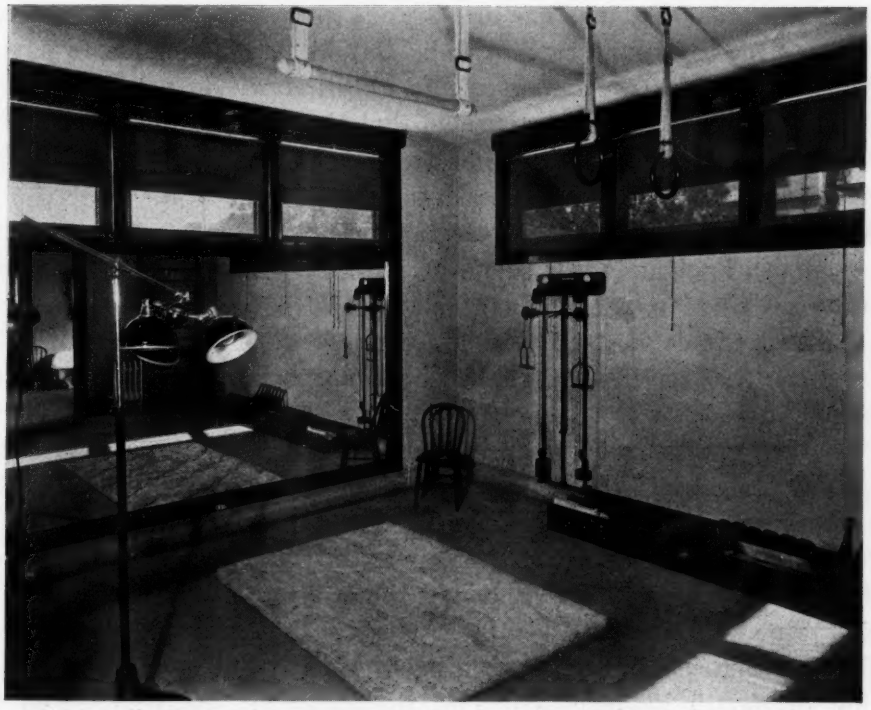


Fig. 70.—Pasadena Dispensary—Alice Murdock Orthopedic Gymnasium.

nity has been open and will be open many, many times, but there are few who feel that they are capable of standing before a gathering of mothers and fathers and in simple language tell them how and why some things occur.

Tooth-brush drills must be introduced as rapidly as possible in the majority of public schools, for many children will not take care of themselves at home, because their parents do not force them.

When we come to *dental examinations by a dentist* in the public schools, many problems arise. The school physician feels that he is perfectly competent to examine decayed teeth. The school nurse feels somewhat the same way. Doesn't she know a cavity when she sees it? Of course she does, but it isn't the wide open crater we can do anything with; it is the small unrecognized cavity, the oncoming malocclusion, the pathologic lesion that we are

after, and from an experience covering an examination of over ten thousand school children, I am forced to the conclusion that it is imperative that a dentist should do the examining, if we are to head off this yearly crop of decayed teeth. There should be a dentist who will examine the child, keep a record of his findings, advise the parents of the conditions present, and try and persuade them to go to their family dentist for treatment.

Some mention of the *dental hygienist* should be made. We need them. If we are to bring our work to a better and a higher standard, we must have better assistants, and that is where the dental hygienist is needed. The question of prophylactic treatment of school children hinges on the employment of the dental hygienist. Out of 4411 children examined in one school year 798 of them had teeth so dirty, with green stain, calcarious deposits, debris of all kinds, that it is one of Nature's miracles that the teeth resisted the carious process as long as they did. But we will be unable to have dental hygienists, even if the law goes into effect, if we do not press our educational work. It is not to be expected that the city authorities will provide the necessary funds unless the public demands it, and it is certain the public will not demand these things unless it is educated up to it.

Along this line the U. S. Government Health Report, Vol. 35, No. 47, states: Mouth hygiene is a business proposition. Regardless of one's means of getting a living, we are all in the business of educating our children. To manage this business we employ a superintendent, but in no other business, as is so often the case in this, would we allow our interests to cease with his employment.

"The per capita *cost of educating a child* is obtained by dividing the total school budget by the number of children in attendance. If a child fails to make a grade, the situation is exactly the same as though a manufacturer found that after passing through the plant an article was defective and unsalable. Furthermore, if it were found that a large proportion of the products of the plant were unmarketable, would not immediate steps be taken to remedy the condition? The establishment of school dental clinics and the teaching of mouth hygiene is one of the important remedial steps which should be taken in the school plants; a reduction in the percentage of retarded children not only makes possible school buildings and reduced overhead charge, but also makes possible the employment of better teachers. As a matter of dollars and cents, mouth hygiene offers splendid returns for each dollar expended in the better growth and development, of the children and by assuring better physical types."

III.

DISPENSARIES AND CLINICS

The *ideal system of public clinics* would be a dental clinic with auxiliary clinics in the schools. It is a serious problem to take children away from school and probably waste half a day for fifteen minutes' work. The teacher looks upon it as an intrusion; she thinks the child has too many people tak-

ing him away from his work. She thinks Johnny is falling behind the others if he misses his lessons, and anyway these things should be done outside of school hours. That is the teacher's point of view.

How does the Board of Education feel toward this work? Take five or seven people out of any walk of life and expect them to be equal to the every-day problems of teaching children. How much do they know about oral hygiene? They know as much as the dentists teach them.

And how does the public look upon our health programs? Let us read some of the answers we received upon our return cards. Those illustrate every point of view.

"I am looking after M———'s physical condition."

"I will do what I see fit to do, and when I see fit to do it."

"I know the needs of R———."

"We haven't any family dentist and we haven't the means to have it done."

"V———'s teeth were filled a short time ago. The dark color on his teeth is from medicine the dentist put on them. We do not feel as though it should be necessary to take him to a dentist again as it is about time he should be getting his new teeth."

"I will have her teeth attended to myself. I don't want any school doctors or dentists to put their hands on E——— whatever."

"Will you please recommend a reliable dentist as we were not very well satisfied with the one who did Paul's dental work in October."

"Clary has not shed his teeth yet."

But we are glad to state that the majority of the cards came back with the answer that the conditions present would be attended to at once. But let us not heed these too much, but rather stress the educational side more.

When considering the clinical work, we must divide it into three or possibly four divisions, namely, *operative, prophylactic, surgical,* and possibly, a *prosthetic division.* The operative work, of necessity, must be done by the dental surgeon and embraces the usual common restorations and treatments.

I have noticed that in some dispensaries there is a tendency to disregard anything but "emergency restorations." Strictly speaking there is no such thing as emergency restorations in dentistry. The surgeon does not cut off fifteen cents' worth of appendix and then have the patient come back later for more. A dental lesion is an emergency as soon as it first becomes manifest. So in dispensary clinical work it is every bit as important to start at the foundation and build up our work correctly as it is in private practice. There is only one excuse that has any bearing upon this problem, and that is the limit of financial support under which most dispensaries are laboring.

The *prophylactic work* can be taken over largely by the dental hygienist. But again the financial problem intrudes itself. The boards of education and city authorities do not, and often will not, see the advantage of spending money on health programs, and hence we must often fall on volunteer serv-

ice and its shiftless results. Often men will give one morning a week for prophylactic work because it is usually an operation that can be finished at one sitting.

The *surgical division* is best handled by an oral surgeon or exodontist giving a few hours once a week. The cases can be selected beforehand by the chief dentist. Then with the assistance of the trained assistant and perhaps a dentist, the extractions and surgical procedures can be taken care of in a minimum of time. If a gas machine is available the patients can be handled more rapidly.

Often children come in with such a mutilated mouth that it is necessary to place some simple *prosthetic* appliance in the mouth until such time as the arch attains its full development and other appliances are necessary. This work can best be handled with the operative division unless the clinic is so large that other arrangements are necessitated.

FINANCE

When we approach the question of financing public institutions we become involved in one of the greatest problems of community life and economics before the world today.

1. In relation to the *financing* of these dental dispensaries we quote again from the essay of Dr. Millberry: "A large number of our people, however, must be cared for by means of a group plan, i.e., by the establishment of public dental dispensaries conducted on a self-sustaining basis, but not for profit. To begin with, such offices must be subsidized by the state, county or municipality, or by private endowment, in order to become established, though such subsidies may be returned from a sinking fund provided in the plan. Dispensaries on the basis of voluntary service are passing, chiefly because adequate honest service to patients is the primal factor, and to maintain this constantly a proper remuneration for professional service must be established."

2. Dr. Davis, director of the Boston Dispensary, and Dr. Warner, superintendent of Lakeside Hospital, Cleveland, in their work on dispensaries have summarized the question of financial service in these words:

"The central principle by which the cost of better medical service for the whole community can be financed is the distribution of the burden of illness so that this does not fall upon an individual or family at the very moment when their ability to bear it is less than usual. Such a distribution of the burden is not inconsistent with maintenance of individual responsibility for self-support, or for the payment, by the individual, of at least his fair average share of the total community's burden. The methods by which the distribution can be achieved are either by mutual insurance or by public taxation. Both methods are likely to be followed, each to cover a portion of the field."

3. A dental department can be financed in the following manner: The city boards of education pay the salary of the full time dentist or dentists. Then the clinic can be made to pay for its own overhead by a proper sliding

scale of fees dependent upon what the social service record shows. We must keep in mind that service to the greatest number is what is aimed at, and not money-making. So if the expenses exceed the intake frequently, do not be discouraged because that is a healthy sign.

In equipping a dental institution put in the very best that can be bought. Do not buy worn out equipment. Make it a place where children will feel that they are not charity. Make them feel that it is an educational institution, one in which it is quite the vogue, so to speak, to become better acquainted with public health questions.

4. The Community Chest is another way that the finances of a dental clinic can be supported. In large cities every organization of charitable intent makes a budget of its probable expense and sends this to an organization called the Community Chest. The Community Chest has a board of directors and is properly incorporated. When the proper time arrives everybody helps to put over a drive for the total sum needed by the Community Chest.

CONCLUSION

In conclusion, once more let me say that we merely aim to assist in focusing the attention of the dental world on the children.

No one man has a monopoly on the best methods to care for children, whatever his field of endeavor may be, but many have the zeal and the enthusiasm for better methods and to that purpose we dedicate this book.

CASE REPORTS AND CLINICS

A TECHNIC FOR MAKING QUICK SETTING HARD PLASTER MODELS*

By R. C. Willett, D.M.D., Peoria, Illinois

THOROUGHLY mix one part of white artificial stone (Healey) to three parts of plaster of paris (preferably Kerr's Snow White). For making the model the proportions are one part of water to two parts of the dry stone-plaster mixture by volume.

Add slowly to the water one-half of the stone-plaster mixture and spatulate until smooth; then add the remaining part of the dry stone-plaster mixture to this thin paint-like wash by sifting slowly. Spatulate with a cutting stroke. This will insure equal crystallization through the entire mass.

Either the stone or the plaster used alone sets slowly, but in the combination described, and mixed as directed, it produces a moderately quick setting mixture which can be readily poured into either a plaster or compound impression, and separated in from fifteen to twenty-five minutes, depending upon atmospheric conditions.

*Clinic given before the American Society of Orthodontists, Kansas City, Mo., March 18-21, 1924.

The amount of dry mixture for one model of average size will be four ounces by volume, and due to the rapid setting of this combination it is not advisable to prepare for pouring more than two impressions at a time.

The result is a model that is equal to one made of white artificial stone alone, and the finishing of it will be more easily accomplished. It is preferable to use distilled water where the natural water of a locality contains a high percentage of soluble salts. Water drawn from a tap is usually charged with air and should be drawn and permitted to stand at least twenty minutes before using, if a less porous model is desired.

CASE REPORTS*

By C. E. Byington, D.D.S., Chattanooga, Tenn.

IN presenting a series of case reports and illustrations of the various classifications, I appreciate the fact that I am bringing nothing new or revolutionary to this society, but my one desire is to emphasize one main thought, if possible, that of considering the adult patient with an embarrassing malocclusion or malformation.

It is the individual's embarrassment that prompts him to seek us to give some possible relief. Something possibly that was omitted by parents through loving carelessness, or ignorance, or sometimes lack of financial ability.

Unfortunately the orthodontic profession does not receive the support and cooperation it should from the general practitioner as they are daily informing parents, when asked pertaining to irregularities of their children's teeth, to "let it alone, Nature will take care of it," or "it is too early, wait until the child is thirteen or fourteen and see if it will correct itself." Then, perchance they have changed dentists and he informs them that they are too old, and thus it goes.

So, it is not always at a favorable age that the patient presents himself or herself, but I am most firm in the position that any orthodontist, worthy of being recognized as an orthodontic specialist, should consider the correction of any case under thirty, and some cases beyond this age, depending on the individual, character of the condition, and the zeal with which the individual is pursuing relief. These are the cases I am now presenting, and I will let you be the judge whether or not these patients have been benefited physically and esthetically. The morale of the patient is often very materially raised, and in every case the gratitude of the patient is profound.

I think you should not promise too much in these cases. Be honest, as you should be in dealing with every case, and give them to understand at the outset that it is a compromise case, and that the finished or completed result will be far short of ideal. Above all be careful about promises regarding the period of time it will take to correct the trouble—how perfect the

*Given before the American Society of Orthodontists, Chicago, Ill., April 9-11, 1923.

profile will be, expression etc. In other words, I would rather have the patients gratified, and the finished case far more pleasing than pictured, than to picture it so beautifully and have them disappointed when finished. In short, use diplomacy, good judgment. Make clear to them that adult patients with malformations will always have facial defects, especially where normal congenital conditions manifest themselves.

There may be an abnormal function, or lack of normal action of lips, nasal breathing and muscles of the mouth, and usually a thickening or shortening of lip or lips, and an emphasized mentolabial sulcus which can

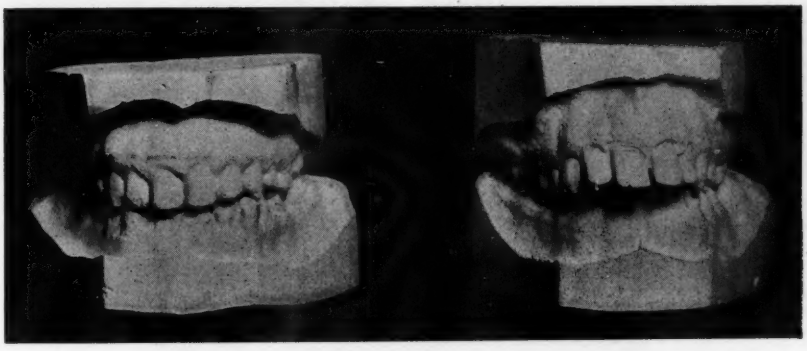


Fig. 1.

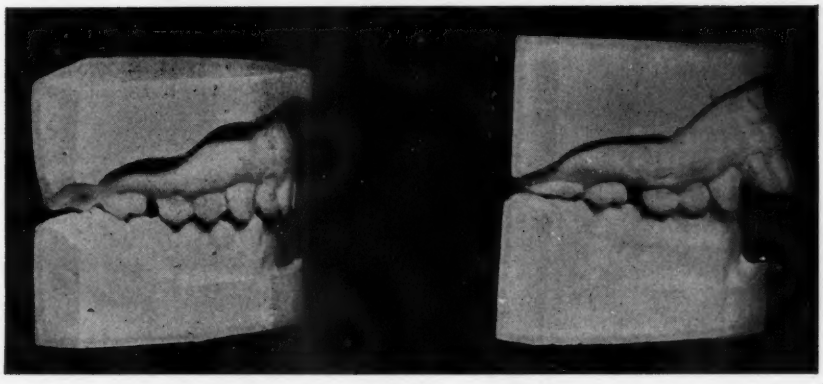


Fig. 2.

never be entirely eradicated. The position and retention of the condyle to the glenoid fossa is more definitely fixed besides the combating influence of the interested muscles after abnormally functioning, make it in the majority of these cases necessary to extract in order to finish or correct in the manner that will remain definitely fixed. If there is anything under the sun that I would like to feel positive of in orthodontia, it is the knowledge that my corrections will remain *corrected.* While I know some of the strictly orthodox will not agree with me, and deem it inexcusable ever to extract, this, however, gives me no concern, but for a well finished or corrected case to revert to the original malformation does concern me greatly, as it should every man present.

Fig. 1 shows a lady twenty-one years of age. The result was obtained in ten months to a day after extracting on either side, and with the character

of appliances revealed by Dr. Burke a minute ago with the spring extension and intermaxillary rubbers.

Fig. 2 shows the relation on the left side at the expiration of the ten months.

In Fig. 3 note the facial outline. I am also advising and advocating the use of adhesive tape just under the nose and down over the depression in the mandibular lip. The patient is cooperating beautifully. Note that the facial outline is materially changed at the expiration of ten months. It was a condition that would have been absolutely impossible to correct had I not extracted.

I failed to call attention to the models. The apex of the teeth are not changed possibly at all, but there is a very material thickening of the sup-

Fig. 3.

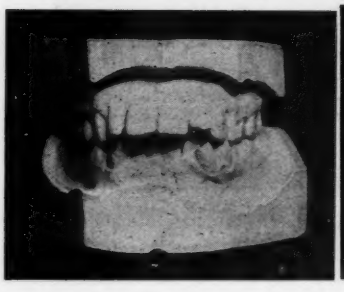


Fig. 4.

Fig. 4.

Fig. 5.

porting process just beneath the gum margin which stabilizes the tooth, and she is getting a normal function of the teeth and lips.

In Fig. 4 we have the models of a young lady. The first impression is that that is a Class II or distoclusion, but it is a neutroclusion condition. This young lady had fallen into the hands of a general practitioner. He had her for two years, and then at the expiration of two years she came to me and I advised extracting.

The measurement of the original model and this model (Fig. 5) shows a gain of about eight millimeters. In other words, she has that much less span for her lip to cover. In Fig. 6 she has unduly drawn her mouth. I

sent her to a photographer and was not present, and I didn't get her back to the photographer again, so the pictures are not entirely satisfactory. She is now a very beautiful girl. She was sponsor for Tennessee at the Confederates Reunion last year. But here is the finished case and what

Fig. 6.

Fig. 6.

Fig. 7.

Fig. 8.

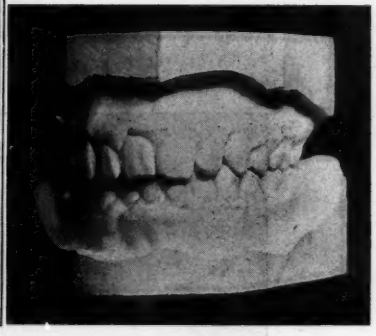


Fig. 9.

Fig. 10.

is accomplished after about two years. It would have been a physical impossibility for it to have been corrected without the removal of the teeth. The teeth are functioning properly; she has all the teeth she needs, and she has a lip span that is normal and easy. The teeth are definitely fixed; the

retainers have been off possibly a year with no disposition to return, because they are resting in easy occlusion. I failed to mention that this second lady was twenty-three years of age.

A patient twenty years of age is shown in Fig. 7. She has no space in the arch for the canine teeth. I expanded the arch and placed those teeth in correct occlusion. It was a case of the teeth being too large for the arch, and after I had removed the retainer, after holding it there possibly fourteen months, I noted a disposition to revert to the original buccaling of the teeth. So in her case, after much consideration and, of course, under protest from her parents, I extracted a premolar on either side above and below. I shifted the whole series of teeth back.

The finished condition is shown in Fig. 8. I want to say that when the teeth were all put to position before I extracted, it was a physical impos-

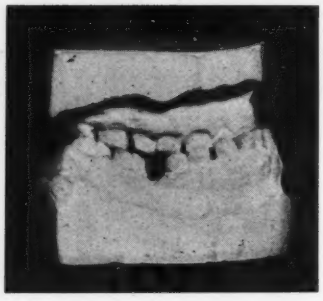


Fig. 11.

Fig. 12. Fig. 13.

sibility for the lip span to meet. She had what you might term a pouting condition of the lips. It looked as though she might have been stung by a bumblebee, and here she has an easy repose of the facial outline. Fig. 9 shows the result of Figs. 7 and 8 where I extracted a premolar above and below on either side. Let me say that in extracting, I try to use some judgment, and do not confine myself to the first or second premolar.

There is one case in which the maxillary molar on the right was abscessed. That tooth was removed. The second premolar on the left was a tooth with a large filling in it, and the first premolar was a good tooth. I extracted the teeth that were of least service in the case, namely, the premolars, maxillary mandibular, and the intermaxillaries were used in forcing the teeth back. (Fig. 10.)

In Fig. 11 we have a mesioclusion, Class III. This young lady was twenty-four years of age. Nothing could be done for her by any general practitioner whom she had consulted.

In Fig. 12 you see that the anterior mandibular teeth conceal almost entirely her maxillary teeth. Dr. Burke, by the way, was in my office some two years ago and this case happened to come into the office to fill an engagement and he saw the case under treatment.

Fig. 14 shows her peculiar combination;—a bull dog expression with a

Fig. 14. Fig. 15.

hound dog feeling, as she put it. The finished case is shown in Fig. 15 This young lady went further to say she was very appreciative, and you will find all adult patients are. They want relief and they have been advised repeatedly that there is no relief. She said she never had a beau until I corrected her case. You can see if she did have, he would have had trouble kissing her except on the chin or the nose. She was married recently. Since I corrected that case she found a young man that admired and married her and she is very happy and appreciative.

CASE REPORT*

By George B. Crozat, D.D.S., New Orleans, La.

THE case I have chosen to report is one which I started with some mental reservation perhaps regarding the ultimate result, and also the manner of treatment and the appliances that I would employ because of the extreme linguoversion of the mandibular teeth of the left side. I had used removable appliances in a number of distoclusions and found them more satisfactory than another type I had attempted to employ. This case presents a bilateral distoclusion with all the mandibular teeth on the left side in linguoversion.

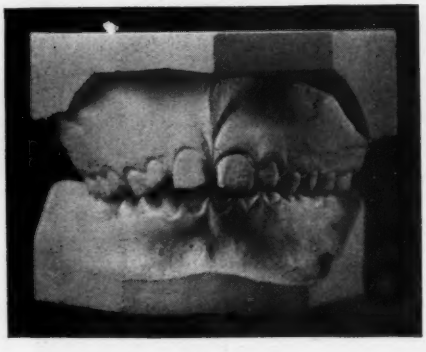


Fig. 1.

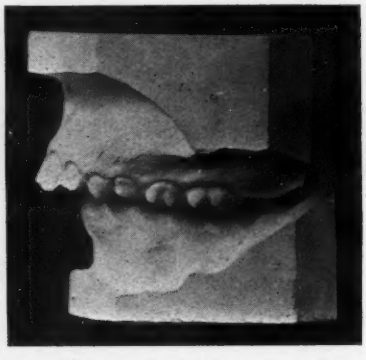


Fig. 2.

Fig. 3.

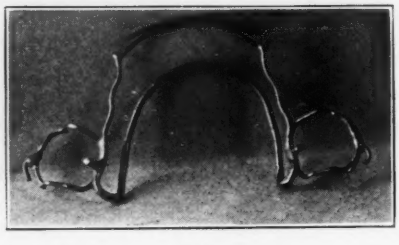


Fig. 4.

Fig. 1 shows an anterior view of this case.

Fig. 2 is a lateral view of the left side, illustrating the maxillary deciduous and permanent molars buccal to their normal positions. I wish to call attention to the relation of the distolingual cusp opposite the buccal groove of the mandibular first molar. The patient was ten years of age at the time of beginning treatment.

In treating this case, I concluded that it would be necessary to use something to relieve the bite. I employed the bite plate.

On the maxillary right the bite plate inclined toward the median line, and every time the teeth on the right side would bite on this incline the

*Read before the American Society of Orthodontists, April 9-11, 1923, Chicago, Ill.

mandibular teeth were prevented from moving buccally. (Fig. 3). On the left side it was perfectly flat, and from time to time this side was trimmed, permitting the mandibular teeth to be moved buccally by the lower appliance as there was no occlusion. The bite plate was retained in position by the convexity of the surfaces of the teeth.

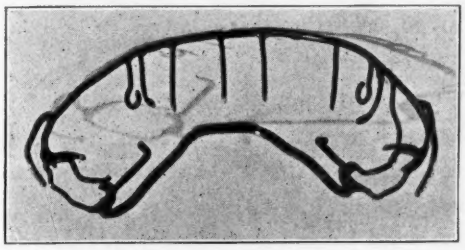


Fig. 5.

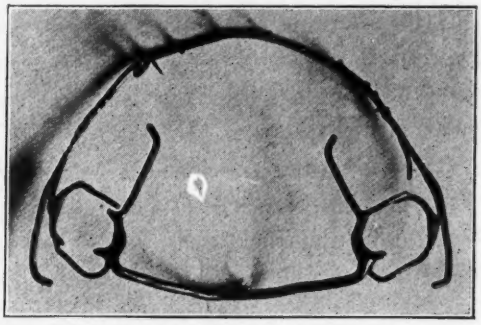


Fig. 6.

Fig. 7.

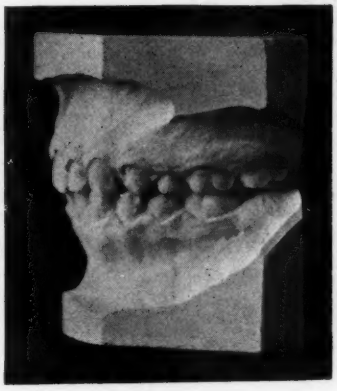


Fig. 8.

Fig. 9.

Fig. 10.

The removable appliance for mandibular teeth is shown in Fig. 4. By the adjustment of this appliance the arch on the left side was expanded. The teeth of the right side did not move buccally because of the inclination of the bite plate on this side.

The removable appliance for maxillary teeth used in the treatment of this case is shown in Fig. 5, with attachments, as I have illustrated before in a clinic. The lingual wires are curved about the mesial surfaces of the first premolar and above are the little recurved pieces made very much like golf sticks, engaging the mesial surfaces of the canines; this serves to maintain the contact of the lateral segments of the arch.

Fig. 6 is an occlusal view of the same appliance, showing the occlusal rests on the molars to prevent the appliance from moving too far gingivally.

An anterior view of the same case after treatment is shown in Fig. 7, and a lateral view of the same case after treatment in Fig. 8.

Fig. 9 shows the patient before treatment, and Fig. 10 after treatment.

This case covered twenty-two months of treatment. The patient wore the mandibular appliance and bite plate for ten months of that time, accomplishing the buccal movement of the mandibular teeth. After those ten months, the maxillary removable appliance was inserted to correct the protruding incisors and move the mandibular arch anteriorly, using intermaxillary elastics.

CLINIC*

By Dr. H. E. Kelsey, Baltimore, Md.

THIS clinic is designed to illustrate a modification of the Young-Angle tube and lock for the attachment of lingual arch wires especially, although it may be used labially as well, if one prefers a vertical buccal tube to a horizontal one, which I do not.

The two features of this tube and lock are first, the rectangular tube instead of the oval or half-round as has been most commonly employed. When used with properly fitting rectangular post wire 0.045 x 0.024 it will make a stable attachment that will not rock, either when it is first put on or after long use. This is due to the fact that the mesial and distal surfaces of the post are flat instead of thin as in the knife edge of the half-round wire, and also because of the dimensions of the post in relation to its length. The more slender the post the better and more permanent will be its fit in the tube.

The second feature is that the lock wire engages under a lug supplied by soldering a piece of square wire to the band just anterior to the top of the tube. This avoids the necessity of the lock wire pressing into the gum tissue below the gingival end of the tube, and it also tends to greater security, as the lock wire may be made fairly short of any soft gold alloy wire. The square wire lug attached to the band serves also as a means of raising the post out of the tube by inserting a flat instrument between it and the lingual wire, and giving it a rotary motion. This is important when the post fits as well in the tube as it should, and it always does when these tubes are properly made.

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*Presented at the Annual Meeting of The American Society of Orthodontists, Chicago, Ill., April 9-11, 1923.

CLINIC*

By H. A. Potter, D.D.S., Kansas City, Mo.

IN giving the technic of the construction of the "tailor-made appliance," as shown at the meeting of the American Society of Orthodontists in Chicago in April, my method of construction is as follows:

After suitable separation, if necessary, has been arranged for in the mouth, and starting with the left maxillary first molar, I use a strip of band material $\frac{6}{32}$ of an inch in width, and 35 gauge, clasping it tightly in the first two fingers. This is placed around the first molar and burnished closely to place. Then with a pair of band-forming pliers, the buccal extensions of the material are pressed rightly to the buccal surface of the molar, having the joint come together at the center of the mesiobuccal cusp.

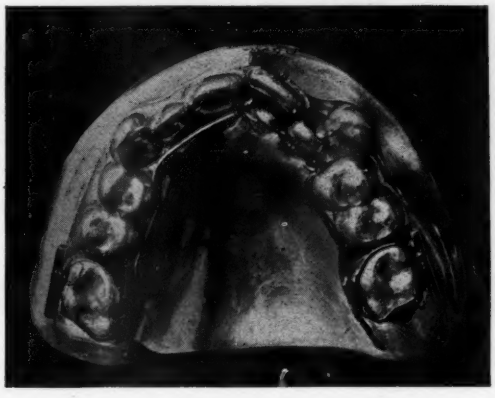

Fig. 1.—The molar bands in place with lingual bars adjusted to give the desired expansion. The left lingual bar is shown curved around the mesial lingual angle of the first premolar; the right in contact with the first premolar and lateral.

The material is then removed and soldered, after which it is replaced, reburnished, and marked on the band, the center of the distolingual cusp, the mesiolingual cusp, and the distobuccal cusp. The band is then removed and slit one-third of its width at those three points.

The band is then placed back on the tooth and burnished very closely to the tooth. The slit allows the band to slip slightly under at these three points, and a drop of solder is placed on the three points and polished down. The band is then contoured at the mesial and distal-approximal side of the band to allow for the alveolar curvature, then removed and a V-shaped slit made at the buccal wing extension.

A small mouse-tail file is then inserted at the bottom of the slit, and a round opening filed to receive the buccal tube. The buccal tube is then inserted and soldered, being sure to have the tube parallel with the occlusal

*Given before the American Society of Orthodontists, Chicago, Ill., April 9-11, 1923.

surface of the molar band, and also parallel with the mesial and distal buccal cusps. The rough surfaces of the band are then polished off very smoothly.

We are now ready for the lingual bars, which are to be soldered to the molar bands. In this particular case it is desired to expand the maxillary left premolars to the buccal, so the lingual bar extends forward to the first premolar, and is curved around the lingual surface, curving in to the mesio-proximal contact point.

With the right maxillary molar, the lingual bar is soldered to extend forward to the mesiolingual angle of the maxillary right central, resting against the right lateral and the first premolar so that, as stress is applied to the lingual bar, the first premolar and lateral will move first. The left central is rotated, and the left lateral being in linguoversion it is necessary to have rotation of the central, and labial movement of the lateral. To accomplish this movement I soldered a 21 gauge lingual bar on the gingival margin of the central band, making a small "Shepherd's hook" at the mesio-

Fig. 2.—The left central band in position with the lingual bar and the Shepard hooks at the mesial and distal ends.

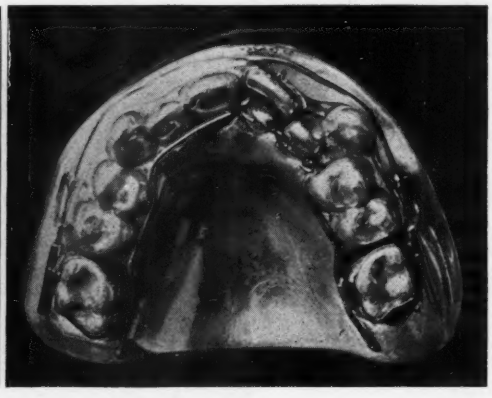

Fig. 3.—The labial arch, with all of the appliance in place ready for ligating.

lingual angle of the central band, extending the lingual bar to the disto-lingual angle of the lateral, where a similar hook was also placed.

On the labial surface of the left central band a small notch was filed in the seam for the labial arch to rest in. I then took a piece of 21 gauge precious metal arch wire, and constructed a labial arch, allowing for general expansion of the whole arch. With one ligature running from the labial arch to the lingual bar, in the interproximal space between the first and second premolar, I gain complete expansion of the left premolars.

Then on the right side, with a ligature run from the labial arch through the interproximal space between the first and second premolar, around the lingual bar and through the interproximal space between the first premolar and canine, I get the expansion of the right premolars, and the right anterior teeth as well. In order to correct the anterior abnormality, I run a ligature from the labial arch to the hook on the mesiolingual angle of the central band, which acts as a hinge, holding the central in position at that point. Then with a ligature running from the labial arch to the hook on the

lingual bar at the distal lingual angle of the lateral, I can move the lateral in position in the same manner as opening a door.

This gives an ideal appliance, neat and inconspicuous, constructed for the individual case, and "tailored" to fit; an appliance in which very few ligatures are necessary. I do not claim this appliance to be the limit of human perfection, but it is an appliance that has proved very satisfactory in the hands of Dr. Tanzey and myself.

DEPARTMENT OF ORTHODONTIC TECHNIC

Edited By
H. C. Pollock, D.D.S., St. Louis, Mo.

ELEMENTARY ORTHODONTIC TECHNIC

By H. C. Pollock, D.D.S., St. Louis, Mo.

(*Continued from the March issue*)

SUPPLEMENTING the description and technic of the fixed removable appliance which appeared in previous pages, a description follows of a case of Class II, Division 1 (Angle classification) treated with a fixed removable type of appliance which incorporates the principles of the Jackson removable appliance, the lingual arch, as well as the Angle ribbon.

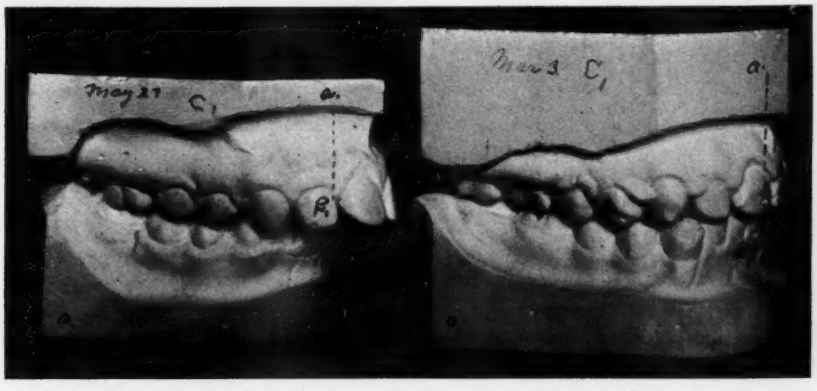

Fig. 51.—Typical Angle Class II, Division 1.

Fig. 51 shows, typical and characteristic of cases of this type, a long, narrow and constricted maxillary dental arch, protrusion of the maxillary anterior teeth, along with a marked inclination or oblique position labially

of the incisors (Fig. 52). The mandibular dental arch is short, narrow, and constricted entirely bilaterally in distal occlusion to the maxillary arch, the lower lip in repose resting almost constantly in distal position to the maxillary incisors, incidentally a typical mouth breather.

Outline of Treatment.—For the sake of simplicity under the general head of elementary orthodontic technic, I have adhered only to symptoms as indicated by the teeth and dental arches (it is not to be construed that for diagnostic purposes the operator does not require other symptoms as indicated by the teeth previous to outlining treatment). Diagnostic symptoms

Fig. 52.—Expansion of the maxillary dental arch indicated (left); after correction is accomplished by use of fixed removable type of appliance (right).

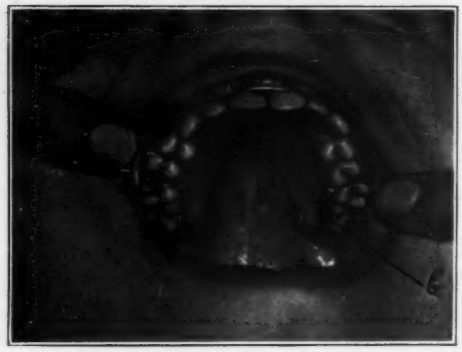

Fig. 53.—Fixed removable appliance with Angle labial arch wire in position.

Fig. 54.—Angle ribbon wire used for the placing in an upright position of the anterior teeth as well as for anterior anchorage.

are manifold independent and aside from the dental anomaly under consideration; however, for discussion in these pages the mechanical angle of the question is featured only.

It is manifestly observed clinically that expansion of both dental arches is required. For this purpose the lingual wire with the double loop (Fig. 53) was used, periodically removing the appliance from the teeth at intervals of about three to four weeks, and bending the lingual wire outward at the point *B*, just distal to the first molars. This wire could not be adjusted distally to this point (*B*) without radically distorting the "set" or "fit" of the appliance. The wire is grasped rigidly with a pair of pliers at this

point and carefully bent outward about two millimeters. By maneuvering and adjusting this wire from time to time the expansion of the dental arches up to and including the cuspid region was very easily controlled. It can be noted (Fig. 51*A*) that the lower mandibular arch must be shifted in the mesial direction in order to correct the distal occlusion which obtains, accordingly for this purpose the usual intermaxillary anchorage was adjusted to place (an anchorage heretofore discussed in these pages) and adjusted in order to accomplish this purpose.

It is desirable to not only shift the maxillary anterior teeth distally in their position, but in addition cause them to take a perpendicular position in the dental arch, correcting their oblique position. For this purpose the principles of torque, which may be gained by the use of the Angle ribbon arch, were applied with the desired result (Fig. 51*C*). These principles have been considered heretofore in the discussion of this appliance. The

Fig. 55.—Typical case Class II, Division 1, with open bite (thumb habit).

Fig. 6.—Same after having been corrected with fixed removable appliance.

four maxillary incisors were banded with the bracket bands, the ribbon engaged therein, with adjustment from time to time in order to cause the anterior teeth to assume an upright position (Fig. 54).

It is to be remembered that, unlike the usual orthodontic appliances, this device is set to place with a temporary and nonadhesive cement, and is entirely removed from time to time for adjustment; however, it cannot be removed by the patient. By the removal from the brackets of the ribbon arch, the entire appliance is snapped easily off with Pullen band removing pliers, described in Johnson's Operative Dentistry, which are ideally suited for this purpose.

Another case answering the general description of the case above described, namely, Class II, Division 1 (Angle) is shown in Figs. 55 and 56, complicated, however, by an open bite. This case was also treated with the fixed removable type of appliance, which seems to render efficient service in cases of this character.

DEPARTMENT OF
ORAL SURGERY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

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ANALGESIA IN ORAL SURGERY

By Jules Frankel, D.D.S., Wilkes-Barre, Pa.

THE well-recognized specialty of oral surgery, with especial reference to exodontia, has followed as a natural sequence the same as some other specialties, not only on account of the location of the structures, but of the variety of their composition. The teeth like the eye, while subject to certain pathologic laws, present not only a contiguity of almost all varieties of tissues, but specialized ones as well. Thus the intensity of specialization in those fields, followed by the justifiable conviction that the scientific extraction of a tooth no longer solely consists in its separation from the mouth, which was once the case, as evidenced by the triumphant attitudes of dentists after extraction seen in many well-known ancient pictures, and even in the symbolism of dentistry in the picture of its patroness, Saint Apollonia. Since oral surgery has attained its proper position, there has followed a very salutary cooperation of internist, dental surgeon and roentgenologist, of inestimable benefit to the patient and these specialties as well.

In a former article[1] the following statement was made: "If operative dental procedures were confined to extraction alone, we might say that local anesthesia had accomplished its purpose; but the various manipulations required for other purposes largely contribute to the apprehension and intolerance of the patient, and there is likewise in many instances preoperative, as well as postoperative pain with which to contend." For a practical application of these premises a series of observations were conducted along the lines of more extensive oral manipulations.

Among a large series of observations embracing the removal of impacted teeth with varying degrees of surgical interference, eight cases have been selected in which excruciating pain was the predominant factor before the operation, and in which the surgical procedure was of such a nature as to reasonably establish the occurrence of postoperative pain of at least equal severity. In all of the eight cases, extensive incisions and chiseling of bone

was performed, and large areas denuded. The situation and extent of exposure of the involved area were in most instances in themselves sufficient to cause excruciating pain.

In Case I the operative field was so close to the mandibular nerve which had to be protected, as well as involving its lingual branches, and the angle of the jaw to such an extent, that hitherto nothing but the hypodermic injection of morphine could possibly have controlled the pain. Insofar as the location of the area and the amount of denuded tissue is concerned, it bears a striking similarity to the case reported by Drs. Bartley and Leavitt,[2] in which the inferior dental nerve was exposed and which was so favorably influenced by the same drug.

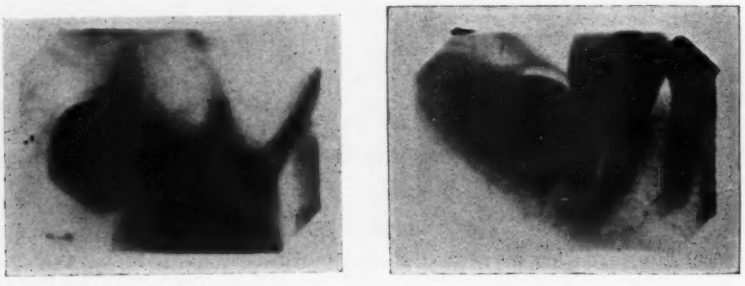
In all of the eight cases allonal was administered, one tablet one-half hour before operation regardless of whether local anesthesia was employed or not, and administered after the operation in a dose of one tablet, the last tablet being taken before retiring for the night. In no case did there occur any of the untoward effects of prolonged drowsiness, incoordination, or dizziness frequently seen after the administration of other hypnotics, nor was there any shock in a single instance.

In the great majority of cases an uncomplicated extraction is not followed by much postoperative pain, the nervousness and fatigue from preoperative pain usually being relieved by small doses of allonal as described in my former article.[1] For that reason, I employed the drug in a large series of cases involving more extensive surgical interference, selecting the eight reported in this article as the most exacting test for the usefulness of the drug. Attention need not again be directed to the distribution of the fifth nerve, excepting the well-known fact that severe pain occurring in the area of its distribution is invariably of an excruciating character, and logically can be employed as the prototype for an acid test as to the efficiency of an analgesic.

The origin and chemical development of this non-narcotic analgesic has been extensively described not only by Dr. M. A. Burns,[3] who was the first to report its value in certain nervous affections in which there was likewise the expression of very acute pain, but in practically all of the articles which have appeared during the last two years from all branches of medicine and dentistry as well. The bibliography of these contributions is appended.[4-12] The dental profession has been looking for some time for the ambulatory control of dental pain, and in many instances, as is well known, many teeth which could have been otherwise saved have been sacrificed, either voluntarily or unvoluntarily, for the purpose of terminating the suffering of the patient. The drug should be tried in even more extensive operations in oral surgery than those herein described, especially those in which the cooperation of the patient is desirable. The relief obtained in the described eight cases of unusual severity is not surprising when we consider the reports of cases of trifacial neuralgia, (Kuh and Gerty[4]), and tic-douloureux, (Burns[3]) in which the severe pain was likewise controlled by allonal.

Case I.—W. E. D., married, age forty-two, was referred to me on December 14, 1923, by Dr. Fuller L. Davenport. His chief complaints were headache and continuous and severe pain on the left side of the face. The x-ray

examination showed impacted maxillary and mandibular molars, and deep seated cancellous bone. The patient was operated upon under ether anesthesia at the Wilkes-Barre City Hospital, on December 17, 1923 (Fig. 1, *A* and *B*). The impacted teeth were removed after chiseling the buccal plate with Gardner's chisels, it being necessary to expose a very large area. The after-treatment consisted of Smith's surgical packing, Dakin's solution at frequent intervals, and a saline mouth wash. The postoperative pain was very severe, and was



A. *B.*

Fig. 1.—Case I.

gradually reduced and finally disappeared within a few days after the administration of allonal, one tablet of 2⅔ grains each four times daily, and with hot milk at bedtime. The amount of surgical interference in this case necessitated confinement to the hospital for five days. This was the case referred to as somewhat similar to the one reported by Drs. Bartley and Leavitt,[2] and is the second reference in the literature of the subject, showing the influence of allonal in the severe pain caused by the extensive denudation of oral tissue required in this surgical procedure.

Fig. 2.—Case II.

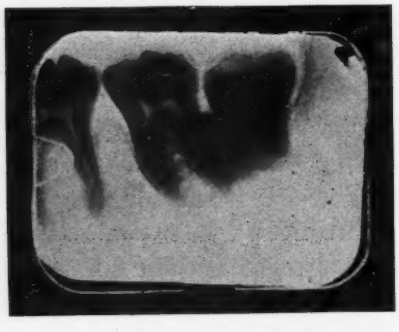


Fig. 3.—Case III.

Case II.—Dr. H. W. D., single, age thirty-one, was operated upon in the office on October 24, 1923, under conduction anesthesia. The radiogram showed an impacted mandibular right molar and cancellous bone, considerable denudation of tissue being required with Gardner's chisels. Smith's surgical packing, Dakin's solution, and saline mouth wash were used. Allonal controlled the severe postoperative pain.

Case III.—Mr. R. D., age twenty-six, complained of severe pain involving the distribution along the trigeminal nerve in the right side of the mandible.

In this case abnormal root formation prevented eruption. Preoperative and postoperative pain in this case was completely controlled with allonal.

CASE IV.—Mrs. I. S., age thirty-one, whose chief complaint was pain in ear radiating to the left shoulder and right side of the face. The radiogram showed impacted right mandibular wisdom tooth and absorption of the roots of the second and first molar teeth. Impaction removed in office under nitrous-oxide anesthesia, the same technic being employed as in the other cases reported. The postoperative pain in this case was very severe and was promptly controlled with allonal.

CASE V.—Mrs. M. L., age forty-three, had been suffering for some time with trifacial neuralgia. The radiogram showed an impacted mandibular

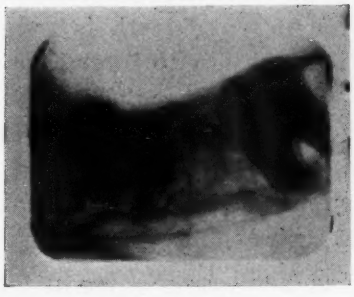


Fig. 4.—Case IV.

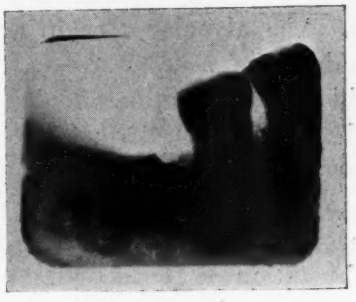


Fig. 5.—Case V.

Fig. 6.—Case VI.

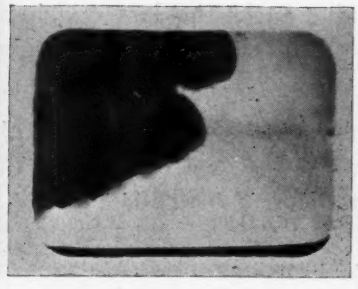


Fig. 7.—Case VII.

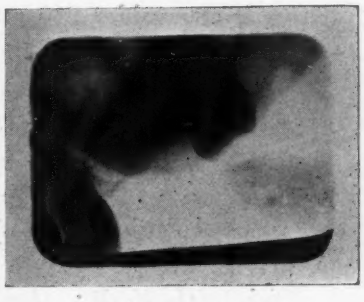


Fig. 8.—Case VIII

left third molar, and a root remaining after previous extraction. Impaction removed in office under nitrous-oxide anesthesia, with the usual technic. Severe postoperative pain practically disappeared within one hour after the use of allonal.

CASE VI.—Mr. F. C. S., age forty-six, has been the subject of neuritis and arthritis for some time with exquisite neuralgic pain along the left side of the face. There was extensive pyorrhea. The radiogram showed impacted maxillary left third and second molar, with root absorptions, necrotic alveolus, mandibular right molar, second and first premolar and both mandibular centrals infected. Impaction removed in office under nitrous-oxide and local anesthesia (novocaine). The severe postoperative pain was completely controlled with allonal.

CASE VII.—Miss F. E. B., age thirty-one, had been complaining of neuralgia and pain in the right ear and side of face. Radiogram showed impacted maxillary right third molar. Impaction removed at City Hospital under nitrous-oxide anesthesia. Allonal administered, which controlled postoperative pain.

CASE VIII.—Miss L. K., age twenty-six, clerk, had been complaining for some time of neuralgia, earache, pain on right side of face, and insomnia. Following is the radiographic report of Dr. L. L. Rogers, Jr., of Wilkes-Barre, Pa.: "There is a portion of the root of the right central incisor of the premaxillary remaining following the extraction, no other evidence of pathology found in the examination of this entire region, including the sinuses. The maxillary left third molar has not erupted and is apparently normal. The alveolar process between it and the maxillary left second molar shows some absorption. The alveolar margin anterior to these teeth is ragged but no definite evidence of necrosis found. There is a slight fragmentation of the alveolus about in the canine and left central incisor regions. The maxillary right third molar is well formed but not fully erupted. The mandibular left third molar is large and well formed but there is quite a bit of absorption about the crown which is not fully erupted, but practically through the alveolar process. The mandibular right third molar is partially erupted, showing absorption of the alveolar process about the crown. There is a remaining fragment of root anterior to this with apical involvement."

The remaining root, as well as the impaction, was removed under local anesthesia. There was considerable postoperative pain. Allonal was administered, one tablet 2⅔ grains each, the last one being taken at bedtime with complete disappearance of all pain within a very short time.

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MINERS BANK BUILDING.

DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

Edited By

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INTERPRETATION OF DENTAL RADIOGRAPHS*

By Hugh W. MacMillan, D.D.S., M.D., Cincinnati, Ohio

SINCE the discovery of the roentgen ray, dental diagnosis has advanced almost exclusively in the field of roentgen ray technic. The old methods of diagnosis, namely: inspection, palpation, percussion, response to thermal changes, and the interpretation of the various subjective symptoms of pain have to a great extent become a lost art. The convenience of the roentgen ray, its time-saving qualities, its Ford-like production and cost, its popularity among the laity, and its unerring diagnosis in long-standing chronic bone conditions make for it a very definite place as a part, but only a part, in the scheme of dental diagnosis.

Its limitations are shown very forcibly when a patient presents with some manifestations of dental ill which the roentgen ray fails to reveal. As a matter of fact except to show abnormalities, dental radiography is of very little value in the diagnosis of affections of the teeth and jaw which have not caused sufficient bone destruction to show definitely through the superimposed compact, thick alveolar plates and investing tissues.

For instance the dental radiograph fails to show the vitality or non-vitality of the pulp until after destruction of the periapical tissue which may take months or years following the death of the pulp. In searching out foci of infection this fact is of supreme importance. It is of far more value for the internist to obtain a report showing the result of vitality tests of each individual tooth than radiographs alone. No dental report is complete until the vitality of each tooth is carefully investigated by the means of diagnosis with which every dentist is cognizant. The usual laboratory report of dental films never contains this information and is therefore valueless as a final report.

*Read before the Cincinnati Academy of Medicine, November 26, 1923.

As the halftones do not reproduce the actual bone changes and exact structural relations with sufficient clearness, the author will send photographic prints of the original films to those interested. Address, Dept. of Anatomy, Medical Dept., University of Cincinnati.

Reprinted from the Cincinnati Journal of Medicine, April, 1924.

Next, the dental radiograph fails to show resorption of the buccal and lingual alveolar plates adjacent to the roots of the teeth. In exposing this area it is impossible to show the degree of radiability of these regions due to the superimposition of the roots of the teeth. A complete dental examination includes a careful investigation of the buccal and lingual soft tissues with suitable instruments to determine the extent of the loss of the supporting bony process. In the search for foci of infection a report is valueless without this examination.

In the region of the superior molars it is often impossible to show the apices of these teeth without exposures from many angles. The usual laboratory "full set," so-called, containing ten or twelve stereotyped views, is always deficient in this respect. But no matter how many angles are taken, the condition of the bone between the three roots of the superior molars cannot be shown as the superimposition of the roots effectually covers this

Fig. 1.—Note the comparative densities and the rearrangement of the cancellous plates around the third molar following the loss of the second molar. This is a beautiful illustration of the changes which take place in the mandible "when the weight and strain are for any reason transferred to another part."

area. Here again exact knowledge is found only by other objective methods and this knowledge is necessary to eliminate the teeth as causative factors in disease.

The alveolar process is composed of buccal and lingual plates of bone which under normal conditions vary in shape, thickness, and density, according to the stress requirements of that particular region. The cancellous tissue binding the two plates together supports the teeth from forces which come chiefly from the occlusal surfaces in cutting, tearing and trituration of the food. The planes of the cancellous fibers are arranged with mathematical accuracy to best meet these mechanical requirements. Following the extraction of a tooth the whole dental mechanism is entirely readjusted and coordinated to meet the new conditions. The changes are beautifully shown in the bone which fills in the space occupied by the roots of the extracted tooth. Here the plates of the cancellous tissue are arranged in supporting trusses and beams in the effort to supply the adjacent teeth with the support

which was lost by the extraction. Contrary to general opinion, following the extraction of a tooth, the alveolar process does not disappear but new bone is deposited in the alveolus up to the level of the alveolar border; this bone, together with the alveolar plates is rearranged according to Wolff's law in such a manner that its external contour and internal architecture are best designed to meet the stress requirements. And may it be added that these requirements vary in each individual mouth and around the individual teeth in that mouth. A tooth showing destruction of the pericementum and alveolar border about the gingival third shows a denser cancellation of the

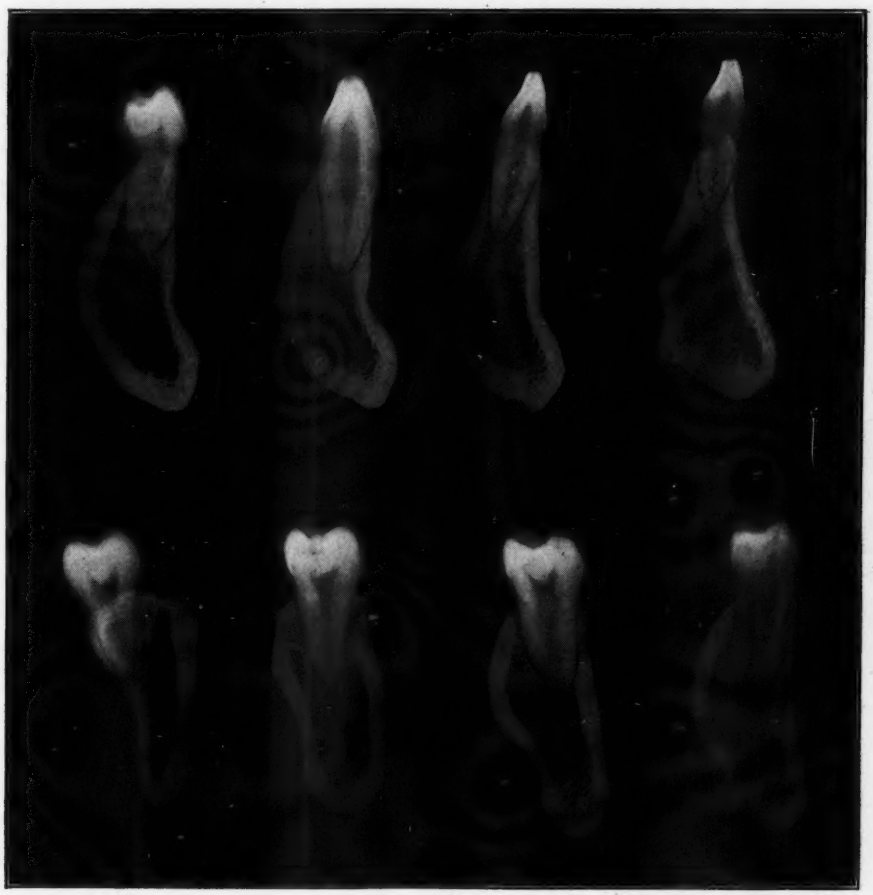

Fig. 2.—Note the relative amount of the cancellous plates as shown in cross sections of the mandible.

process around the lower part of the root, providing that tooth is exercised by mastication. A single molar which bears the brunt of mastication alone is characterized by a denser cancellation of the process.

From the standpoint of the interpretation of dental radiographs these areas of denser cancellation are often considered pathological and termed by some condensing osteitis and described as caused by traumatic occlusion when they are merely functional changes in the bone. When these areas happen to occur around pulpless teeth exhibiting areas suggestive of infective foci they are further condemned. It has even been stated that the bac-

teria in these areas of condensing osteitis are more virulent than those found in so-called rarefying osteitis. This latter condition, according to the writer, may be interpreted as rarefied areas occurring in bone affected with disuse atrophy.

The great majority of dental radiographs are made in laboratories by specialists who do not profess to examine the teeth or gums by any other means. It is the custom when a patient comes in for examination of other parts of the body to require a history before an opinion is given, especially if the disease is in any way obscure. Even with the history the resulting opinion often contains as many alibis as there are impressions at the bottom of a senior medical student's history chart. But not so with the dental diagnosis. The report abounds with such glaring terms as abscess, caries, dead teeth, condensing osteitis, rarefying ostietis, pyorrhea, degenerating bone, virulent areas, streptococcic infection, granulomas, residual infection, concealed bone absorption, etc., etc. The report is dictated long after the patient leaves and a history of the teeth is never thought of. But the deplorable part is that the report often contains only a fraction of what a dental diagnosis should contain. This incomplete written report is too often accepted by the physician and the patient as being the last word in dental information. When the dentist gets the report and is forced to spend nearly an hour in examining each and every tooth for vitality and caries, the alveolar border for lesions not disclosed by the roentgen ray, and the history of each suspicious tooth, the bewildered patient wants to know the reason for the discrepancy in the opinions and the dentist wonders who is really entitled to the fee for examination.

Fig. 3.—A study in normal relations and densities in the second bicuspid region.

A dental radiographic report should contain information relative only to the densities which are departures from the normal. It should point out specifically abnormal densities in the alveolar border, the walls of the alveolus, the periapical region, the root of the tooth, the crown of the tooth, and any departure from the normal position of the teeth, as well as root canal fillings and recurrent caries. The pathological terms enumerated above should be left entirely out of the report unless the examiner is willing to take the full responsibility of the complete examination. Each and every one of the changes which are abnormal should be noted. To mention only one tooth

among several pulpless teeth which happens to have a large area of rarefaction about it is misleading to physician, dentist, and patient and increases the skepticism and loss of confidence of the patient who is at loss whom to believe in the controversy regarding the disposition of the teeth.

Similar to the caption printed on certain business stationery, "This order contingent upon strikes, fires, floods, and other conditions beyond our control," a caption should be placed upon the dental radiographic report which should read as follows: "This report records only the abnormal densities capable of being shown by the x-ray and is, from a diagnostic standpoint, in no manner conclusive. Infective foci may be present which have not advanced sufficiently far to be shown by the x-ray. The interpretation of these densities must be done in conjunction with vitality tests, other objective methods, and the patient's general history."

This caption should be used for the following reasons:

(1) It has been shown that due to certain structural features many parts of the teeth and surrounding bone cannot be shown by the roentgen ray.

(2) Pulp vitality or nonvitality is not conclusively disclosed.

(3) Acute or subacute inflammations of the teeth, gums and peridental membrane are not recorded.

(4) The virulence of the infection is not determined radiographically. How many times must it be emphasized that the size of the destructive area has nothing to do with the virulence of the infection?

(5) The interpretation depends upon the general resistance of the patient.

(6) The interpretation depends upon the age of the patient.

(7) The roentgen ray does not show the character of the root-filling operation. It makes considerable difference if the canal is filled a la Callahan or by some embalming or devitalizing agent.

(8) The interpretation depends upon the history of the teeth as in orthodontic treatment, abrasion, accidents or surgical operations.

(9) The x-ray has not yet been able to investigate and report upon the character of the pulp and the putrid material under misfitting gold crowns. Here is where the negative report is absolutely valueless.

(10) The interpretation depends upon the general history, local dental history, laboratory examinations and the evidence peculiar to the individual patient, none of which is shown in the film.

Considerable has recently been written upon the closer cooperation between physician and dentist. In no other field is this cooperation so absolutely indispensable as in attempting to arrive at a correct diagnosis. If dental radiographs were interpreted in the same manner that radiographs of other parts of the body are interpreted, i.e., in conjunction with the clinical findings, this closer cooperation would be realized and the patient immeasurably benefited.

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ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Therapeutic Measures Conducive to Bone Formation. A. F. Hess (New York). The Dental Cosmos, February, 1924, lxvi, 2.

The author discusses the great frequency of caries in the children of the United States as shown by actual inspection of schools in different parts of the country, both urban and rural. Caries was the second leading cause for military rejection during the late war. He assumes a relationship between caries and defective osteogenesis. The latter process can be fostered by any one of four factors—lime ingestion, phosphorus ingestion, a vitamin-like substance or growth agent, such as occurs naturally in cod-liver oil, and finally radiant light. In animal experiment deficiency of calcium and deficiency of phosphorus occasion the same symptoms; but even with a theoretic insufficiency of these elements the growth agent in cod-liver oil suffices for osteogenesis. The author finds this same principle in egg yolk and finds it absent or very slightly present in most of the ordinary fats and oils, whether of animal or vegetable origin. Radiant light from an ordinary arc lamp or mercury quartz lamp behaves like the growth agent. This action is not local but systemic.

What has been said of bone does not necessarily hold equally good for the teeth. Thus deprivation of the antiscorbutic vitamin, while it may not prejudice bone development, will certainly be followed by caries and imperfect dentition. But this is a factor of very minor significance in national caries. In rachitic children there is no typical disorder of the teeth, but various forms of imperfect dentition are apparent, varying with the case—chalky teeth, hypoplastic teeth, brown teeth and teeth with irregularities in enamel formation. We are quite ignorant as to how rickets is able to induce these anomalous conditions.

A Few Aphorisms Concerning Pyorrhea Alveolaris. H. Prinz (Philadelphia). The Dental Cosmos, February, 1924, lxvi, 2.

The author goes back over 150 years to the published statement of John Hunter which mentions a primary wasting of the alveolar process, beginning at the edge of the socket. Hunter has been verified by the combined research

of the past fifteen years. Today we know that pyorrhea is a primary atrophy of the alveolar bone, the latter having a natural tendency to such atrophy because, unlike most bone, there are no muscles inserted in it. But occlusal impact takes the place of muscular attachment to some extent and there is normally an equilibrium between the occlusal impact and the tendency to absorption. Infection is only an unessential accident in the development of pyorrhea. In vertical pyorrhea we see separation of the teeth and loosening; followed by pocket formation and infection. In the horizontal type we see suppurative gingivitis and large quantities of supragingival calculus, pocket formation being slight and separation rare, loosening of the teeth occurring at a very late period. Diagnosis can be made only from roentgenograms which show the amount of absorption—never from mere presence of gingivitis or gingival suppuration. Horizontal pyorrhea can be prevented and benefited by ordinary buccal hygiene. In general the treatment should be prosthetic and surgical, local applications being of little value.

Atrophy of the Alveolus Paradentitis and Pyorrhea Alveolaris. F. J. Lang (Innsbruck). Vierteljahrsschrift für Zahnheilkunde, 1923, xxxix, 4.

The author cites the increasing consensus of opinion that pyorrhea is due to a primary atrophy of the alveolar process. In 1909 Römer termed it a local osteomalacia, Hopewell-Smith and Talbot use the terms halisteresis and decalcification, and Fleischmann and Gottlieb osteolysis. Absorption of the calcium leaves the bone a mere mass of fibrous tissue. In order to throw some light on this subject the author examined the alveolar processes of 32 deceased subjects. There was apparently no selection of material but the cadavers were taken as they were sent into the section room. In six of the 32 there were present various degrees of pyorrhea; while the remaining 26, free from this affection, gave ample opportunity for controls, presenting a great variety of alterations of non-pyorrheic character. The conclusions reached were as follows: alveolar atrophy is not a matter of years for while it is most often encountered in advanced age it may be met with in early life. It may be associated with a great variety of local and general conditions including cachexias; but in these cases there may not be the least suggestion of clinical pyorrhea. Alveolar atrophy may be favored by a great variety of local and general conditions—for example in the old by arteriosclerosis and independently of age by calculus formation. In regard to the exact cause of pyorrhea the author agrees with Römer and others that there is a form due to rarefying osteitis and paradentitis, which has a sequela, the atrophy of the alveolar process. Paradentitis is in other words something distinct from so-called primary or spontaneous atrophy.

The microscope is requisite to differentiate between these two conditions. The author does not deny that atrophy of the alveolar process may also be a factor in the development of pyorrhea, so that we have two forms of the latter, one secondary to atrophy from whatever cause while the other and more important is the result of inflammation of the paradentium and rarefying osteitis.

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EDITORIALS

A Journal's Responsibility to Its Readers—Extracting First Molars for the Correction of the Irregularities of the Teeth

RECENTLY a dental journal with a wide circulation published an article entitled "Simple Methods of Correcting the Irregularities of the Teeth." This article was written by two individuals and was founded upon "forty years' experience." They contend that malocclusion of the teeth can be corrected and the treatment of malocclusion greatly simplified by the extraction of the four first permanent molars. The authors of the article make very positive statements, but they fail to present any evidence to substantiate them. The evidence we are asking for would be models of cases before extraction of the first molars and models of the cases made several years after the supposed correction of the malocclusion by extraction of the four first permanent molars.

We remember several years ago certain men contended that the extraction of first molars would relieve dental deformities and irregularities of the teeth, but as our knowledge of occlusion increased it was the opinion of men who studied malocclusions treated by the extraction of the first permanent molars that a case of malocclusion was never benefited by this treatment. The "one hundred per cent vitality movement" seems to have aided to a certain extent the advocating of the extraction of the first molars for the correction of malocclusion. We have been associated with several large dental clinics during our professional career and have probably seen more malocclusion and more mouths than many others who have been interested in the subject of malocclusion.

During our college clinic experience we have seen many malocclusions which have been treated in college clinics and many cases which have not been treated; we have failed to see one single case that has ever been benefited by the extraction of a first permanent molar, or by two, three or four permanent molars. We have seen many cases of malocclusion which have been produced by nothing else but the extraction of first permanent molars. We are prepared to prove the statement, that a case never existed but that the extraction of the first permanent molars exaggerated the malocclusion instead of improving it. We are not making this statement simply as a "grand-stand play" but can prove what we are saying by models in our own collection and by models in the collections of other men, who have been engaged in the practice of orthodontics for a number of years.

It is to be regretted that the article which we referred to was accepted for publication by the editor of a journal which has such a wide circulation: because some of the younger men may be misled into following a very detrimental practice if they listen to the advice given in the article in question. This brings us to the question of the responsibility of dental journals to their readers. We realize dental editors cannot be informed upon all technical procedures, but we do believe they should know which is absolutely false and misleading from beginning to end. We are aware that certain men will differ in regard to certain procedures and that there may be ground for a question of a doubt in regard to certain things which are presented for publication. However, we can see no reason that an article which is so contrary to the principles of practice and which presents statements which have been disproved so many times should ever be accepted for publication by a dental editor, if that editor and journal has the interest of the profession at heart. The dental editor has a certain responsibility and he should try to see that the information given in his publication is not false or misleading from one end to the other. We are aware of the fact that there exists a certain group of individuals who will go to any extreme to get into print, and there are men in the profession who will make statements absolutely unfounded by facts simply for the purpose of seeing their names in print. This class of writers should be carefully censored by dental publications because the first duty of the editor is to the profession and not to some writer who simply desires to get his article published for the publicity it will give him.

The Principles and Technique of Oral Surgery*

THIS book has been especially written for the guidance of the general practitioner who may attempt to do any one of the several accepted minor oral surgery operations. It is to be regretted that the scope of the book has been made studiously narrow, as explained by the author in the preface, i.e., "I have omitted from this book the consideration of several lesions, such as cleft palate and hare-lip, trifacial neuralgia, diseases of the salivary glands, partly because they are so completely and ably presented in other books, and partly because their treatment requires distinct specialization, and they are, therefore, of merely academic interest to the majority of men." We cannot agree with the author that while the treatment of trifacial neuralgia requires distinct specialization and is therefore without the scope of his work, the radical treatment of the antrum, which he describes in detail, does not evidently require such specialization.

In Chapter I, the author discusses under the heading of Surgical Technic, such subjects as surgical cleanliness, antiseptics and germicides, infection, antiseptic and aseptic methods in surgery, drugs, sterilization, preparation for operation, preparation of patient, anesthetics, conduct of operation, postoperative treatment, suturing, dressing and drainage. Each subject is clearly and thoroughly discussed. Under the topic of The Surgeon, the author says that, "it is well to bear in mind that a surgical case, of whatever nature, should be viewed from the patient's standpoint, although it may be a very minor one from a surgical standpoint. It is not essential to overstate the gravity of the condition, but as a rule patients do not react kindly when the source of their complaint is regarded lightly or with levity." Another illustration of the author's professional attitude towards the subject occurs in his discussion of Trauma: "Traumatization and rude manipulation of living tissue are opposed to all the principles, precepts and refinements of modern surgery. It should always be remembered that in all operations we are dealing with living sentient entities—the tissue cells—and that their response to treatment and their chances of recovery are in the largest degree inversely proportionate to the operative trauma. All who aspire to attain the highest degree of success in surgical operation must learn the value of light and delicate manipulation of living tissues and should bear in mind that at best aggregate or individual cell life is obtruded upon."

In the next chapter, seventeen pages are devoted to Examination and Diagnosis, in which the subject of pain is treated very elaborately. In our opinion this chapter is one of the most brilliant of the entire text because of its remarkable thoroughness.

Chapters III, IV, V and VI are devoted to a consideration of Hemorrhage, Inflammation, Acute and Chronic Suppurative conditions and the subject matter illustrated by photographs, diagrams, radiograms and case histories.

*The Principles and Technique of Oral Surgery. By Adolph Berger, D.D.S., Brooklyn, New York, 1923, Dental Items of Interest Publishing Company, 450 pages, 355 illustrations. Price, $7.00.

The operation of apicoectomy is described in detail and well illustrated by diagrams of the various steps, and the subject of devitalized teeth is presented from all angles, with the conclusion that, "the further treatment of the subject will be based upon the assumption that a great many pulpless or devitalized or infected teeth must be removed, and that a great many can be conservatively treated, cured and retained as innocuous members of the host."

Sixteen pages are devoted to Infection and Complication Arising from Local Anesthesia, prominent among which are broken needles, and the author describes carefully his technic for their removal.

The subject of Diseases of the Antrum is discussed in two chapters and is excellently presented, both in text and diagrams, and forms another one of the most important portions of the entire book. It constitutes a valuable contribution to the best literature on the subject.

Chapters XIII and XIV describe in detail cysts of the oral cavity. The author gives their classification, etiology, clinical signs and symptoms and several methods of treatment, as well as presenting numerous radiograms of cysts from his own practice.

The author next discusses such subjects as Bone Regeneration, Removal of Buried Roots and Alveoectomy, and Impacted Teeth. He does not, however, devote any space at all to a systematic presentation of extraction, and this we feel is to be lamented, because of the opportunity which he might have had of explaining how to avoid the various accidents requiring subsequent surgery. In this same connection, we regret that the author has not seen fit to discuss the Gardner and Winter technics. Occupying as he does, through his clinical work and writings, a position of authority, his views would be seriously taken and would materially help just such members of the profession as are expected to read this book.

Seventy-two pages are taken for a very complete presentation of the subject of Fracture and the author describes several methods of fixation together with the actual technic of splint construction.

The last chapter is devoted to Neoplasms. Here, at the very outset the author tells us that, "The subject of neoplastic diseases . . . . . is so overwhelmingly important that whosoever assumes the responsibility for their diagnosis . . . . . must have more than a mere passing knowledge of the subject." He devotes thirty-three pages to the subject and cites numerous authorities and theories in explanation of some of the probable causes.

Dr. Berger's book will undoubtedly be accepted as a valuable textbook, in that the material is presented in an interesting and pleasing style, the sequence of subject matter is logical and the illustrations and photographs, as well as radiographs, are so excellently reproduced as to make them a valuable adjunct to the text. —*A. W.*

ORTHODONTIC NEWS AND NOTES

Dental Research at Mellon Institute

Director E. R. Weidlein of Mellon Institute of Industrial Research of the University of Pittsburgh has announced the establishment by E. R. Squibb & Sons of New York, N. Y., of an Industrial Fellowship that has for its purpose the investigation of problems relating to the chemistry of preventive dentistry. Plans have been formulated for the study of the following problems: (1) relation between composition of saliva and dental disease; (2) effect of different diets upon composition of saliva; (3) action of acids upon enamel; and (4) physical and chemical properties of the tooth. The results of these investigations will be published from time to time, as the progress of the works seems to warrant.

The incumbent of this Industrial Fellowship is Dr. C. C. Vogt, who has been a member of Mellon Institute, engaged in research on various dental problems, since 1914; and he will have the benefit of the advice and clinical cooperation of Dr. H. E. Friesell, Dean of the School of Dentistry of the University of Pittsburgh. The resources of dentistry and chemistry will thus be combined for the solution of important dental problems.

The American Society of Orthodontists

The Twenty-fourth Annual Meeting of the American Society of Orthodontists will be held in the new Atlanta-Biltmore Hotel, at Atlanta, Ga., April 14, 15, 16 and 17, 1925. (Mark off the date now.)

Walter H. Ellis, Sec'y-Treas.,
397 Delaware Avenue,
Buffalo, N. Y.

Clinton C. Howard, President,
Doctors Building,
Atlanta, Ga.

Notes of Interest

Dr. L. M. Christie announces the removal of his office to 1909 Massachusetts Ave., at Dupont Circle, Washington, D. C.

Dr. P. R. Ashplant announces the opening of his office in The Times-Press Building, Middletown, N. Y. Practice limited to orthodontia.

Dr. Carl N. Dorman announces the removal of his offices to 805 Forum Building, Sacramento, Calif. Practice limited to orthodontia.

Dr. Hugh T. Berkey announces that in the future his practice will be limited to orthodontia exclusively, Suite 310 Central Bldg., Corner Harrison and Wayne Sts., Fort Wayne, Ind.